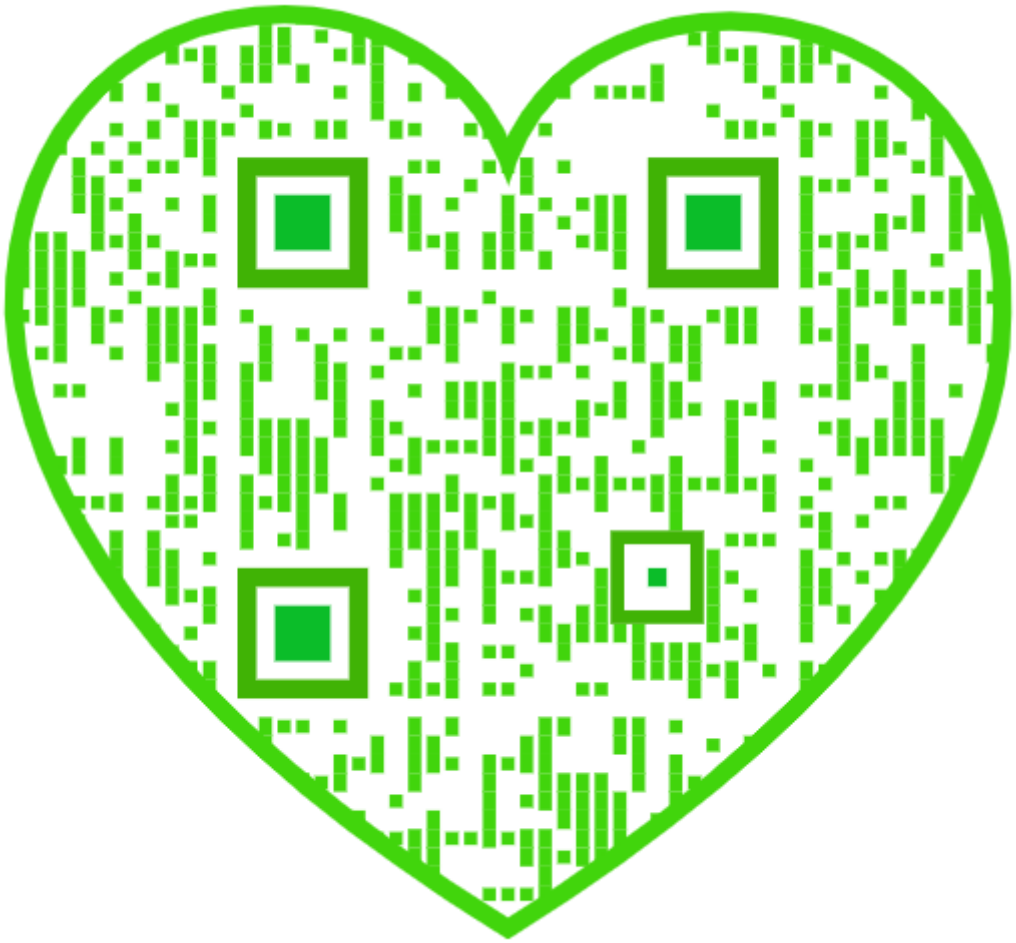

MUNICIPAL SANITATION

IN THE

UNITED STATES

BY

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PREFACE.

THE preparation of the present volume was primarily undertaken to meet the author's personal needs. An investigation along several lines of public health work suggested the utility of a comprehensive study of public sanitary methods. As a consequence this volume was prepared and it is hoped that the material here gathered will prove useful to other health officers as it has to the author. It is not a treatise on the principles of sanitation and in fact these principles are rarely referred to, but it is, rather, a compendium of sanitary practice. It is not so much intended to advise what ought to be done as to record what has been done. Neither is it intended to be a presentation of the author's own views though these may occasionally be indicated. The subject under consideration is the sanitary functions of municipalities, the latter term being used in its broadest sense, including cities, villages, townships, and counties. Only the sanitary work of local government is considered and not that of the state or the federal government, except in so far as the latter engage in work which theoretically belongs to local officials.

This volume was begun several years ago and though the attempt has been made to bring the parts first written up to date, yet omissions will doubtless be found. During this time many cities have adopted new sanitary methods and sometimes the same city is used to illustrate the workings of both the old and the new method. Doubtless also many errors will be found which must be attributed to the shortcomings of the author. These will be the more readily forgiven by those who have experienced the difficulty in compiling municipal reports and searching the maze of municipal and statutory law.

While in some instances the author has not been able to secure information either from printed reports or by correspondence, and that too from some important cities, yet most municipal officers have been very kind in answering the queries sent them and have often been to

much labor in preparing a satisfactory reply. The author thoroughly appreciates the assistance thus given without which the volume would have been impossible.

Many blank forms have been introduced in the appendices as it is believed that these often illustrate methods of work better than any verbal description. A subject index will be found but no place index. A place index without reference to the subject with which the place is connected is of little use and one with such reference would have considerably increased the size of an already too bulky volume.

C. V. C.

PROVIDENCE, March, 1901.

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CHAPTER I.

SANITARY ORGANIZATION.

PUBLIC sanitation is a development chiefly of the latter half of the present century, but it is not entirely a novelty. Many of the evils with which sanitation deals have long been recognized, and remedies for them have been sought through legislation, and many of the advantages which sanitation affords social life are fully appreciated by the more populous communities. As a rule the subjects with which public sanitation deals have an increasing interest with compactness of population and complexity of social relations. Wherever there are large cities with a highly developed civilization there the need of public action in this direction is most acutely felt. Hence we are not surprised that many works which would be included in the discussion of the subject we are now considering, such as a system of sewerage, a public water supply and municipal baths, were carried to a high degree of perfection in the cities of ancient Greece and Italy, particularly in the latter.

On the other hand public works of this kind are not needed and are impossible in new communities. Moreover such communities with a sparse population do not need many police regulations to maintain comfort and health, such as are required as population grows denser. Yet even in new settlements some need is felt for public aid and protection along these lines. This was true of the growing colonies of the New World. While an organized health department in town or colony was not at first thought of, yet it was not long before legislation began to recognize that the comfort and health of the people demanded attention, and the germs of our modern sanitary law appeared.

The registration of vital statistics was very early provided for in the colonies,[1] but though this is now considered the first step to be taken in sanitary work and the basis of all future progress, it was not so considered at that time. The object of such records was legal rather than scientific. The earliest record that the writer has met with of sanitary activity, was the action of the selectmen of Boston[2] in 1678 followed

[1] Virginia, Act 24 Feb., 1631-2, Hening's Statutes at Large, Vol. I., p. 155.

[2] Boston Record Commissioners' Report, Vol. 7, p. 119, 6 May, 1678.

shortly by similar action in Salem,[1] in attempting to restrict the spread of smallpox. On the 25th of October,[2] 1692, the General Court provided that the selectmen of Boston, Salem and Charlestown, and other market towns of the province, should regulate slaughter houses and similar establishments. In 1693 the Governor and Council quarantined at Long Island, Boston Harbor, the fleet of Sir Francis Wheeler which had arrived from Martinique sorely afflicted with what is supposed to have been yellow fever.[3] In 1699[4] a law was enacted providing for maritime quarantine, which however was disallowed in privy council on the 22d of October of the same year. This act was followed by Rhode Island[5] on the 27th of February, 1711.

In the sanitary legislation previous to the latter part of the eighteenth century, executive powers were usually conferred upon the town governments and upon them fell the duty of enforcing sanitary law. This was true of the Massachusetts statute of 1692. In other cases state officers were to administer the law as in Rhode Island in 1711, where justices of the peace were to maintain quarantine. It is only since the establishment of independence that there has been any definite organization of local government for sanitary purposes.

All police power in the system of government established in the United States is vested in the legislative bodies of the various states. The mechanism by which this power is exercised varies very greatly in different states and at different times; and even in a single state at one and the same time the police power may be exercised in a variety of ways.

So far as concerns sanitary affairs, and indeed in all affairs the police powers of the state may be exercised in two general ways: First, the state legislature may enact general laws and provide directly for their enforcement by the appointment of officers in the pay and directly under the control of the state. Or, second, the state may delegate both legislative and executive powers to any local units of government which may exist within the state. The former of these two methods is not the one here under special discussion, though it will be necessary to consider it at times, as spheres of sanitary activity which in one group of states are entirely given over to the towns or counties, are in another group reserved to the state. The details of legislation in regard to the purity of food products, especially dairy products, and the purity of

[1] Act of Salem Selectmen, 18 October, 1678.

[2] Acts and Resolves of the Province of Massachusetts Bay, Vol. I., p. 59.

[3] Acts and Resolves of the Province of Massachusetts Bay, Vol. VII., p. 384.

[4] Acts and Resolves of the Province of Massachusetts Bay, Vol. I., p. 376.

[5] Laws of the Colony of Rhode Island (1719), Reprint of 1895, p. 65.

inland waters, in regard to the communicable diseases of animals, and in regard to quarantine and the registration of vital statistics, are very commonly reserved to the state. If not formally reserved, the state acts so efficiently and so much better than the local units that these matters are neglected by the latter. Not only does the state thus through its legislature direct certain sanitary affairs as above, but it employs its executive powers in the same fields. As will be seen in the discussion of these subjects, many states not only have elaborate laws concerning the adulteration of food, and quarantine, but directly control the administration of these laws through the agency of state appointed boards or officers. Dairy commissioners, state boards of cattle commissioners, state inspectors of food and state quarantine officers are not uncommon, and the state board of health frequently is given executive control of any or all of these matters.

The state sanitary organization which is at present established in all the states except Georgia, Idaho, Montana, Oregon and Wyoming, is the embodiment of the interest of the state in sanitary affairs. It is given more or less legislative and executive authority in such matters as experience has shown, or as is hoped, can be best controlled in this way; but take it all in all throughout the states, the state board of health is considered chiefly as an advisory board. It is not to meddle in local affairs any more than is necessary. In other words, the principle of local self-government in sanitary as in other affairs is in the main recognized and adhered to.

The most direct and complete control of local affairs by state sanitary organizations was seen in New Orleans previous to 1898. This city was, so far as its sanitary affairs were concerned, governed entirely and directly by the state board of health and its appointees. There was, however, a special reason for this arrangement. The City of New Orleans is much the largest city of the state, indeed of the whole south. It is the gateway of the Mississippi valley, and an enormous commerce passes through it. Epidemic disease may find and has found entrance here and devastated a score of states. The safety of the whole state being so closely dependent upon the city, the state assumed control of the city so far as its sanitation was concerned. This would probably not have been done in a northern state; it has not been in Massachusetts, New York or Pennsylvania, for their great seaports, but in the south where the importance of the state as compared with any of its parts is so much greater than it is at the north, the proceeding was not an unnatural one. This complete control of local sanitary affairs by the state is found not only in isolated instances like New Orleans, but is the settled policy over the larger part of at least one state. In

Florida the county boards of health have been abolished and the state health officer appoints agents and through them has full control of maritime and domestic quarantine, and the state health officer has large general powers in regard to the abatement of nuisances, and has special executive powers "where two or more railroads meet."

The control of the state in local sanitary affairs is further seen in those states in which the local sanitary board or officer is appointed by the state.

In Connecticut the county health officers are appointed by the judges of the superior court and must be attorneys at law. These county health officers appoint the local health officer except in certain municipal corporations. This centralizing of the executive power in sanitary matters is a novel thing in New England, and it is also an extremely novel procedure to vest the entire control of sanitary affairs in the hands of the legal profession. It is not to be wondered at that this system has not met with the approval of some of the best health officers in the state. In Vermont the state board of health appoints the health officer who is *ex-officio* a member of the local board of health and he is also removable by the state board of health. In Indiana the state board of health has not the power of appointment but may remove members of county or municipal boards of health and also health officers for specified cause.

In Delaware the county health officers, three in number, are appointed by the governor.

In West Virginia three of the five members of the county boards are appointed by the state board of health, but only on the nomination of the county court.

In North and South Dakota the state board appoints two of the three members of the county boards.

In Kentucky the county board, consisting of three or more discreet and intelligent citizens residing in the county, is appointed by the state board of health.

In Mississippi the county health officers are appointed by the state department of health.

In South Carolina [illegible]

the legislature in 1895 enacted the present law compelling the municipalities to organize boards of health.

There are certain isolated instances of a state appointed sanitary executive in municipalities as in Baton Rouge and Shreveport where the governor appoints three of the five members of the local board of health. In San Francisco previous to the charter of 1899 the board of health consisted of the mayor of the city and four physicians in good standing, residing in the city and county of San Francisco, appointed by the governor. So also the recently established board of health in Detroit is appointed by the governor.[1]

In several of the states[2] it is provided that when the local authority whose duty it is to appoint a board of health fails to appoint, or when the local board in any municipality or county fails to act, the state board of health shall step in with full executive power. In New Jersey, when a nuisance in one township affects the citizens of another, the state board of health has executive powers. In Minnesota the state board of health may compel two or more townships to act together for the prevention of communicable disease. In New York the state board may compel action of the local board in nuisance cases.

It is evidently not the intention in these states that the state shall ordinarily exercise general executive functions in local affairs, but it is deemed so important that no portion of the state shall be without sanitary protection, that the state board of health is given such powers in certain contingencies. Even in states like New York and Ohio, where township or similar boards of health are obligatory, or in North Carolina and Colorado, where county boards are obligatory, the possibility of failure to appoint or of failure to act after appointment is provided for. Perhaps the provisions of the New York statutes are as explicit as any.[3]

In Alabama the state board of health, which is the state medical society, is to control and fix the duties of the county boards, which are the county medical societies.

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[1] Michigan, Chapter 10 of 1895, Section 5.

[2] Arkansas, Delaware, Colorado, Maine, Missouri, New York, North Carolina, Ohio, Pennsylvania, and Virginia.

[3] New York, General Laws (1896), Public Health Law, Section 11:

"If any municipal corporation, authorized by law to establish a local board of health, shall omit to do so, the state board of health may, in such municipality, exercise the powers of a local board of health and appoint a health officer thereof and fix his duties and compensation. The compensation of such health officer and the expenses lawfully incurred by him and by the state board of health in such municipality shall be a charge upon and paid by such municipality until such time as a local board of health shall be established therein, whereupon the jurisdiction of such health officer and of the state board of health conferred by this section shall cease."

In many cases, as will be considered later, the state reserves to its state board of health executive powers in matters of quarantine and control of communicable disease. The state board of health also in some states does much executive work in regard to nuisances, the diseases of animals, food supplies, the protection of water and ice. In New York and Pennsylvania and some other states the state board appoints its own inspectors, each of whom has his own district. In Pennsylvania these inspectors perform the duties of health officers where none have been appointed by the town, and may assist local health officers where they have been appointed.

The local political division made use of in sanitary administration varies in different parts of the Union according to the varying prominence which such divisions have obtained in the progressive evolution of local government from colonial times. In one state it is the township or city, in another the incorporated village or borough, and in others still, the county or parish.

As a rule, considerable aggregations of a comparatively dense population or what are known as cities, control in their capacity as cities, their own sanitary affairs; but there are exceptions even to this. Reference has been made to the control of New Orleans by the state board of health. Other examples are the former control of Pensacola and Apalachicola, by the counties in which they are contained, and the merging of the sanitary interests of Jersey City in the organization of Hudson County. Not only do cities, as the term is ordinarily understood, have as a rule an independent authority, but smaller aggregations, even as small as five hundred persons or less, are often given the same powers. In many states the larger number of the small but more or less compact communities are incorporated either by general laws or special acts under the name of cities, villages, boroughs or "towns." Such incorporations within the townships are very common in the middle, central, and western states. In general it may be said that wherever municipal corporations are found, whether they have a population of 500 or 500,000, they are usually authorized by the state to establish a sanitary organization.

Outside of municipalities, sanitary organization, usually in the form of boards of health, may be established either in townships or counties. The real political unit in our system of government may be either the township or the county. In New England the county has always been of little moment, while the powers and importance of the township are very great. In the south, on the other hand, probably owing in part to the sparseness of the population, the county became the important political division. The middle states more nearly resemble the south in

this particular and the states west of the Alleghanies and north of the Ohio more nearly resemble New England; but nowhere is the county of so little importance as in New England. It would naturally be assumed, therefore, that in New England and the west the township would be made the sanitary unit, and in the middle states, the south, and the far west, where New England influence is less felt, the county would be the unit. This is, in the main, true.

The following states have county sanitary organization: Alabama, California, Colorado, Connecticut, Delaware, Idaho, Indiana, Kentucky, Kansas, Louisiana, Maryland, Mississippi, Montana, North Carolina, North Dakota, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia and Wyoming.

In New Jersey there were formerly county boards of health, but their place has been taken by the township and municipal boards appointed under the law of March 31, 1887, the board for Hudson County only remaining; but even in this county nearly all the communities have their local boards, so that little opportunity is left to the county board for usefulness, and its function is limited to the collection of vital statistics.

In Florida there were until recently two county boards of health, viz., in Escambia and Franklin Counties, containing respectively the important ports of Pensacola and Apalachicola. Other counties formerly had boards of health, but they have all been abolished in order that the state board of health might have entire charge of quarantine. In California a county board of health is not required by statute in every county, and in many counties there is none. In the other states above mentioned, the legislature has provided that a sanitary organization shall be established in every county.

In Idaho and Montana the board of health consists of the board of county commissioners and one physician appointed by them.

In Colorado, Indiana, Kansas, Maryland, Tennessee, Utah, Washington and Wyoming certain county officers are made *ex-officio* boards of health.

In Colorado, Indiana, Kansas, Maryland, Washington and Wyoming, it is the county commissioners that are the board of health; in Tennessee the board of health of the county consists of the county judge or chairman, clerk of county court, county health officer or jail physician, with the latter as president; in Utah it is the county commissioners and the health officers of the sanitary districts.

In Alabama, under the sanitary organization which there prevails, the state medical society is the state board of health, and the county medical societies in affiliation with the state medical society are the

county boards of health. These county medical societies delegate their health powers to their board of censors. Much the same plan is in vogue in North Carolina where the county boards of health consist of all the registered physicians in the county together with the mayor of the county-town, the chairman of the county commissioners and the city or county surveyor.

In Delaware, Kansas, Louisiana, North and South Dakota and West Virginia the county board of health is an independent organization. In Delaware it consists of three physicians called county health officers. In West Virginia the county board of health consists of three persons, one of whom shall be a physician and all of whom shall be nominated by the county court and appointed by the state board of health, and these three are to serve together with the president of the county court and the prosecuting attorney of the county. In North and South Dakota the state board of health appoints two persons, who, together with the district attorney of the county, shall serve as the county board of health. In Louisiana the police jury of each parish (county) appoints a board of health consisting of one member from each ward (except municipal wards). Three of the members are to be physicians.

In Mississippi the state department of health appoints a physician as health officer in each supervisor's district, and these constitute the county board of health.

In Virginia the county judge must, on recommendation of the medical society, appoint a board of health to consist of three physicians, nominated by the county medical society, the clerk of the court, and the chairman of the board of supervisors.

In Connecticut and Texas the sanitary affairs are administered by a county health officer and not by a board of health. In Texas this official is called the county physician and is appointed by the county judge.

The jurisdiction of the county sanitary organization may extend over the whole county including any municipalities which it may contain. In Alabama[1] the establishment of other sanitary authority within the county is forbidden.

[1] Alabama Code (1896):

SEC. 2433. "No local board of health or executive medical body of any name or kind for the exercise of public health functions, other than the county board of health, must be established in any county, town or city"; but while the established county board is the sole executive it depends largely for its initiative on the local political authorities.

SEC. 2431. "The court of county commissioners, or the proper corporate authorities of any city or town, may jointly or separately invest the county board of health with such executive powers and duties as may be deemed necessary for the preser-

In Connecticut the authority of the county health officer is very great and his jurisdiction extends over the whole area of the county. He appoints the local health officers except in those municipal corporations where a sanitary organization is already established, and furthermore has control of all the boards of health and health officers in his county. The following sections from the statute explain these relations:[1]

It shall be the duty of said county health officer to cause the execution of the laws relating to public health, and the prevention and abatement of nuisances dangerous to public health, and of the laws relating to the registration of vital statistics, and to co-operate with and supervise the workings of the boards of health and health officers within his county; and he shall have all the powers of a grand juror in each of the several towns within his county, in matters concerning prosecutions for violations of the laws concerning contagious diseases and public health, nuisances injurious to health or life, and violation of the by-laws or ordinances relating to public health and contagious diseases, and for the prevention or removal of nuisances dangerous to public health, adopted by any incorporated city or borough or any town, and for violation of the laws relating to the registration of vital statistics.

Said county health officer may be removed at any time by any judge of the Superior Court. Such county health officer, as soon after his qualification as may be, shall by a writing under his hand appoint for each town some discreet person, learned in medical and sanitary science, to be health officer for said town, except in such towns containing incorporated cities or boroughs whose limits are co-terminous with the limits of said town in which there exists under and by virtue of a charter a board of health or health officer or committee. In each town, except in towns having an incorporated city or borough within its limits, said town health officers shall have and exercise all the powers and duties now by law vested in and imposed upon town boards of health or health officers or committees; and in towns within which there exists a city or borough the limits of which are not co-terminous with the limits of such town and where by charter such city or borough is empowered to appoint a health committee, health officer, or board of health, such town health officer shall exercise the powers and duties of his said office only in such part of said town as is outside the limits of said city or borough.

In Texas the state and county health organization is established entirely for the management of communicable disease, and particularly for quarantine. The county health officer is here directly under the control of the state health officer, and in turn controls the health officers of municipalities.

It would appear that in the Dakotas the county board has jurisdiction over the whole county.

The more common plan, however, is for the county board of health to have no jurisdiction in villages or cities with established sanitary organization. The county board of health is a device confined chiefly

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vation and promotion of the public health, and for the prevention of the introduction or spread of contagious or infectious diseases; such powers to be exercised and such duties to be performed under such rules and regulations as may be determined upon between such board and such court, as corporate authorities."

[1] Connecticut, Chapter 248 of 1893, Secs. 3–4.

to those states in which the population is sparse and in which there are few large towns. It is in these states, too, that the township is least developed. It would appear that the county board of health has proved useful in administering affairs for a widely scattered rural population, but that wherever compact villages and small cities are numerous, these serve better as administrative units; but yet much depends upon the traditional notions of the people in regard to political affairs. Thus in some of the western states it would seem that the distribution of the population would invite the development of the county; but the influence of the township idea was so great with the early settlers that it stamped itself strongly on the political development of the state, and township and village boards of health are found instead of county boards. Such states are Iowa, Michigan, Minnesota, and Wisconsin.

In other cases even where county boards are established they have no jurisdiction over incorporated villages or cities. Thus in West Virginia,[1] "When any town, city or village has a board of health of its own the jurisdiction of the local (county) board shall not extend thereto."

In Kansas[2] the law provides that "The local boards of health hereby created shall not supersede or in any way interfere with such boards established by municipal regulations in any of the counties of this state."

Colorado provides that the county board of health shall exercise its powers only "in all parts and portions of each and every county not represented by town or city organization."

Owing to the fact that the county in the south and west has been developed at the expense of smaller political divisions, it has followed, as has been shown, that the county board of health has in the states of this section been established to look after the sanitary interests of the people outside of the incorporated municipalities; but in New England and the northern central states the county has not so much importance in local affairs, for the township performs here many important functions, and among them the supervision of the public health.

In the New England states and in Illinois, Iowa, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania and Wisconsin, the township is made the unit of sanitary control. It is true that the township has a considerable importance in some other states, as Kansas, Missouri, the Dakotas and Nebraska, but it is not so highly organized as in the states first mentioned, and the sparseness of the population is

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[1] West Virginia, Code (1891), Chapter 150, Sec. 7.

[2] Kansas, General Statutes (1897), Chapter 75, Sec. 11.

not conducive to the formation of township boards of health, and in most of these western states public sanitation in any form does not receive as much attention as it does in older and more thickly settled communities.

In most of the states where the township system is in vogue, certain town officials are made *ex-officio* boards of health. These states, together with the officers invested with sanitary powers, are mentioned below.[1] It is provided in some of these states that the townships, although authorized to organize an *ex-officio* board, nevertheless may establish a special board or health officer and delegate to it or him their sanitary functions. This is true in Massachusetts, New Hampshire, Rhode Island, and Wisconsin. In Massachusetts about half the townships, including all of less than 3,000 inhabitants, have *ex-officio* boards of health, but most of the larger towns and cities have independent boards.

In Maine it is provided that in each town there must be established a board of health of three members.

In New Hampshire the selectmen of the towns must appoint a board of health.

In Connecticût, in 1893, the township board of health was abolished and a health officer appointed in each town by the county health officer, the town health officer to have all the powers of the old township boards of health.

In Pennsylvania the act of April 11, 1899, provided that the school directors of every township shall have certain powers for the control of communicable disease. The feeble development of the township in Pennsylvania has never rendered practicable the establishment of a strong township sanitary organization.

As in most of the states which have established county boards of health, this board has no jurisdiction over incorporated municipalities,

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[1] Illinois. Supervisors, assessor, and township clerk.

Iowa. Trustees.

Massachusetts. Selectmen.

Michigan. Township board, consisting of the supervisor with two justices of the peace whose terms next expire and the township clerk.

Minnesota. Supervisors together with a physician when the supervisors consider it necessary.

New Jersey. Township committee and assessor with a physician to be appointed by the committee.

New York. Town board with the addition of one citizen appointed by the board.

Ohio. Trustees.

Rhode Island. Town Council.

Vermont. Health officer who is appointed by the state board of health together with the selectmen.

Washington. Town board.

Wisconsin. Town board.

so in the states with the township system, it is not intended that the township board of health should exercise jurisdiction over such corporations. The writer has not found this power in any state, and in several it is expressly provided in the general laws that the townships shall not have this power. Such provisions are found in Connecticut,[1] Illinois, New Jersey, New York, and Ohio.

One of the problems of sanitation is to secure an efficient execution of the laws in rural districts. A good township system is of much assistance in this, but the township needs to be pushed some by the central authority. In most states this is done by moral agencies and excellent results have flowed from such work by the state board of health in Maine, Massachusetts, Michigan, Minnesota and other states. In Connecticut and Vermont the state exercises greater control by appointing the local health officer. In Alabama a different plan is followed. The county medical society divides up the county into "beats," and these into districts, and sometimes sub districts, and appoints one of its members resident therein a health officer for each district.

From this brief sketch it is seen that local sanitary administration is provided for by law over the entire area of thirty-six states, including a population of 52,304,922 in 1890, or eighty-three per cent of the total population at the census of that year. Twenty of these states have provided for a county form of sanitary government[2] and sixteen states have a township form of sanitary government.[3]

Then, too, in states where the provisions for local sanitary government are not complete for the whole territory of the state, such government may be established by special enactment or charter, and thus a considerable portion of the population may be brought under sanitary administration. Thus in Arkansas, California, Missouri, and Nebraska, the general laws for the incorporation of municipalities provide for the exercise of sanitary functions by the different classes of cities. Thus it appears that a large proportion of the population of the country is nominally under some sort of local sanitary control, either by the county, township or municipality.

In states where the people have been most thoroughly drilled in the practice of local government, there the local sanitary organization is the

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[1] See Connecticut law, p. 9.

[2] Alabama, Colorado, Delaware, Idaho, Indiana, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Montana, North Carolina, North Dakota, South Dakota, Tennessee, Texas, Utah, Washington, Virginia, West Virginia, and Wyoming.

[3] Connecticut, Illinois, Iowa, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Washington, and Wisconsin.

best, so that as a rule the township states are better provided for than those states in which the township system is not well developed. If a township state has a well organized and energetic state board of health, the chance is still better for the general organization of efficient local boards of health. In Minnesota in 1898 all of the thirty-eight cities, and all but twenty-two of the 358 villages and boroughs had a board of health. While a scheme of sanitary administration is nominally provided for the larger portion of our population, it must be admitted that it is not as a rule very efficient in really rural communities. Little attention is paid to sanitation in the country, and it is almost entirely in compact villages, towns and cities, that successful administration is found. It is with such communities that this work is chiefly concerned.

In New England the dual conception of the township as both a political and corporate unit, has prevented the development of the true municipality. In New England townships have often attained a population of 25,000 or 30,000 before changing their democracy for a representative form of government and taking on the habiliments of a city; and in Connecticut, even with the incorporation of its largest cities, the township system was still retained, the town and city governments existing at one and the same time over the same area. The evils of township government in populous communities have been partly overcome by the limited establishment of fire, school, or taxing districts; but the incorporated village and the small city are not common in New England. Outside of this region the advantages of establishing separate and corporate government for small aggregations of population have long been recognized, and laws for their incorporation are found on the statute books of most states. According to the census of 1890 the urban population of the United States was estimated as about 20,000,000. As a large part of this population is living under a pretty well developed sanitary organization, the importance of this part of our subject is apparent.

The organization of municipalities may be under special charters or general laws. In New England, the cities are usually organized under a special charter for each city; and this is true of many of the larger cities in other parts of the country; but most of the smaller cities and boroughs, and the villages, are incorporated under general laws. We may look for the authority for their sanitary organization in their charters or general incorporation laws, or in special laws having for their object the preservation of the public health.

The following is a brief summary of general legislation in the different states in regard to municipal sanitary organization:

Arkansas has two classes of cities and incorporated towns. The city councils in cities of the first and second classes have power to establish boards of health.

California. "The board of trustees, council or other corresponding board" . . . shall "establish by ordinance a board of health to consist of five persons, one of whom at least shall be a practising physician . . . or if practicable, a civil engineer."

Colorado. The mayor and council or trustees, except when it is otherwise provided by charter, are *ex-officio* boards of health.

Connecticut. "Where it is not otherwise provided by charter, the mayor of such city, or the warden of such borough, shall nominate some discreet person, learned in medical sanitary science, to be health officer for such city or borough, which nomination will be confirmed or rejected by the common council of such city or the burgesses of such borough within thirty days thereafter." In case of failure on the part of the mayor or warden, the county health officer appoints the local health officer in cities and boroughs. As a matter of fact, of the eighteen cities and twenty boroughs about one-third have health officers appointed by the county health officer.

Delaware. The common council of every city must appoint annually a board of health of not less than three nor more than seven persons, one of whom must be a physician and one the port physician if there be one.

Illinois. Cities have power "to appoint a board of health and prescribe its duties and powers."

Indiana. In Indiana in all three classes of cities the mayor nominates, with the confirmation of the council, three commissioners of health and charities. In unclassified cities the mayor and common council, and in towns the trustees, are *ex-officio* boards of health.

Iowa. The mayor and aldermen of cities and the mayor and council of villages or towns are *ex-officio* boards of health.

Kentucky. The cities of the state are divided into six classes and incorporated under general laws. Cities of 10,000 and over are to appoint a board of health consisting of the mayor and six others. In all other cities the boards of trustees or the council must appoint a board of health of three persons not members of the appointing board.

Louisiana. The council of all municipalities is to appoint a board of health of five members.

Maine. It is provided that "There shall be a local board of health in each city and town in this state, to be composed of three members, anything in the charter of such city notwithstanding."

Massachusetts. Chapter 332 of the Acts of 1895 provides for a board of three in all cities except those where there is some other charter provision.

Michigan. The mayor and aldermen of cities and the president and council or trustees of each village which has no charter provisions to the contrary, are *ex-officio* boards of health, but when they deem it necessary, the council of a city or village may establish a board of health.

Minnesota. The Statutes (1894), Sec. 7048, provide "that all villages, boroughs, and cities shall have a board of health to be chosen and to consist of the number hereinafter provided, anything in the charter of such village or borough notwithstanding." The board is to consist of not less than three, one of whom is to be a physician to be elected by the council or corresponding body.

Mississippi. "A city, town or village may pass sanitary laws, establish a board of health, and enforce the collection of births, health and mortuary statistics."

Missouri. Municipalities are divided into four classes of cities and villages. In cities of the first class, of over 100,000, the board of health consists of the mayor, the presiding officer of the council, a commissioner of police, and two regular practising physicians. The health commissioner, appointed by the mayor and council, is also a member of the board.

Nebraska. Boards of health in municipalities are organized under a general grant of authority to legislate for the preservation of the public health.

North Carolina. In North Carolina municipal boards of health are organized under the following: "The authorities of any city or town are hereby authorized, not already authorized in its charter, to make such regulations, pay such fees and salaries and impose such penalties as in their judgment may be necessary for the protection and the advancement of the public health."

North Dakota. Cities are to have a board of health to consist of four aldermen appointed by the mayor, the health officer who is appointed by the mayor, and the city engineer.

Ohio. There are in Ohio general incorporation laws for the municipalities of the state as required by the constitution, but the classification is such that what are practically charters have been enacted for the more important cities. There are ostensibly ten classes of cities besides villages. Except in the largest cities there must for all incorporated places be a board of health consisting of six members appointed by the council with the mayor in addition as a seventh member.

Pennsylvania. The organization of cities and boroughs is provided for by the general laws of Pennsylvania and the cities are divided into six classes. In cities of the first class — Philadelphia — the board of health is a bureau in the department of public safety. By a recent act it consists of three members.

In cities of the second class — Allegheny and Pittsburgh — the health department is also a bureau in the department of public safety. The superintendent of the bureau and the other employees are appointed by the director of public safety.

In cities of the third class the board of health consists of the mayor and four other persons, or a separate board of health may be appointed as in boroughs.

In cities of the fourth, fifth and sixth classes, and in boroughs, the board of health consists of five, of whom not less than two in cities and one in boroughs shall be physicians, to be appointed by the mayor or burgess with the consent of the council.

Rhode Island. The board of aldermen (equivalent in the statute to town council) is *ex-officio* board of health in cities.

South Carolina. Every city or village shall have a board of health of five persons not members of the council, except that in cities the number may be increased to twenty as the city council may determine. The board of health was formerly elected by the freeholders, but by chapter 284 of 1897 it was changed to appointment by mayor or intendant.

Texas. The court of county commissioners may appoint a board of health for towns and villages which shall be under the direction of the state health officer.

Tennessee. Cities of over 5,000 inhabitants must have a board of health.

Utah. Cities must create a board of health and prescribe the powers and duties of the same.

Vermont. The health officer, together with "the trustees or bailiff of villages and the aldermen of cities," constitutes the board of health.

Virginia. Each municipality must, if required by the medical society, have a board of health to consist of three physicians appointed by the corporation judge, but nominated by the local medical society, together with the clerk of the municipal court and the mayor.

Washington. The common council of cities shall be *ex-officio* board of health, or shall appoint wholly or partially from its members a suitable number of persons as a board of health.

Wisconsin. All the cities of over 4,000 inhabitants are divided into three wards and in these the mayor is to appoint a commissioner of

health who holds his office for two years, but only a few cities are organized under the provisions of this general law, and most cities have either special charters providing for a sanitary organization or else have established boards of health under Sec. 1411, Annotated Statutes (1898). This provides that the town board, village board or common council of every city shall within thirty days after each annual election organize as a board of health, or shall appoint wholly or partially from its own members a suitable number of competent persons who shall organize as a board of health.

In Wyoming the city council of cities and the trustees of towns are *ex-officio* boards of health, and each board of health must appoint a health officer.

Sanitary organization in most of the villages and cities of the country is thus provided for by general laws, and this practice of incorporation by general legislation has in some states been extended to all the cities even the most populous. Nevertheless the principle of classification is such in these laws that of the largest cities each stands alone in its class, and practically receives a special charter. This is true of Cincinnati, Cleveland, and indeed the larger Ohio cities generally, Philadelphia, Indianapolis, Louisville, Milwaukee, Omaha, St. Louis, and several others. Besides these the following important cities depend upon special charters for their sanitary organization: Atlanta, Baltimore, Boston, Brooklyn, Buffalo, Charleston, Chicago, Denver, Detroit, Hartford, Milwaukee, Minneapolis, New Haven, New York, Providence, Richmond, St. Paul, San Francisco. In Massachusetts and Rhode Island, though the cities generally have special charters, their sanitary affairs are in most cases governed by general laws.

There has been much charter making of late and many charters of important cities are of very recent date. The tendency of these charters is towards making the charter a framework only of government, and of leaving the details to be filled in by general legislation. The appointment and tenure of office of officials, and the relation of departments, the organization of the legislative branch, and the separation of legislative and executive functions are the matters generally considered. Hence in the Cleveland, Philadelphia and San Francisco charters the powers and duties of the board of health are not referred to, they having been provided for by special enactments or general laws. Notwithstanding this tendency towards general legislation for the organization of cities, and the limitations of the scope of such legislation to fundamentals, it is nevertheless true that some of the recent sanitary legislation for cities has been both special and specific; see Chapter 413 of special laws of Minnesota, 1889, for sanitary organization in Min-

neapolis; and Chapter 10 of 1895 of Michigan for Detroit, and Chapter 105 of 1891 of New York for Buffalo. The charter of the City of New York, Chapter 378 of 1897, contains much specific sanitary legislation, but it is mostly adopted from the consolidation act of 1882.

While it is generally so arranged by statute that the jurisdiction of county, township and municipal health departments shall not overlap, it is not always so. The authority of county over local boards in West Virginia and elsewhere has previously been alluded to. Reverse conditions sometimes prevail. In the East it would be rare for a municipality to exercise any authority outside of its own corporate limits; but in other sections of the country it is by no means uncommon. In Illinois, cities may legislate concerning offensive trades and similar nuisances for one mile beyond the limits of the city. Chicago by a former city charter was permitted to enforce quarantine regulations to a distance of fifteen miles beyond the city bounds. Indiana cities have jurisdiction for four miles in regard to offensive trades and ten miles in regard to river pollution. Cities in Arkansas have jurisdiction of five miles for quarantine, and in Nebraska, three miles; in Texas and Utah, ten miles. Baltimore has quarantine powers for three miles outside the city limits on land and fifteen miles on water.

County, township and municipal boards of health are merely different forms of local sanitary organization which have been developed by the varying history of the different sections of our country, or have been necessitated by varying densities of population. In their nature they are all the same, and therefore in considering their powers and duties provided for by statute law, they may all be considered together. The organization of boards of health may be provided for, and their duties and powers prescribed in various ways. In the first place the legislature of the state may provide by special enactment for a sanitary organization in any particular city, county or other political unit. Second, the state may provide for the establishment of boards of health in any group of localities by means of general laws; and lastly, the powers of the local sanitary authority may be greatly affected incidentally by laws enacted for specific purposes, but which recognize and make use of an already established organization. Each of these three methods will be separately considered.

1. Special Legislation for Sanitary Organization.

Local sanitary authority may be established by a law specifically enacted for that purpose, or second it may be established by special municipal charter. Special legislation is of course more apt to be found in

those states in which the method of dealing with municipalities is chiefly by means of special legislation, and where there are no general provisions for municipal incorporation, but it may be found anywhere. It was more common in the past than at present for two reasons; first, because the method of dealing with these matters by general legislation is recognized more and more as the better way, and second, because in former years when public sanitation was somewhat novel, it was only exceptional circumstances which could lead a community to see the necessity for any sanitary organization at all. An epidemic, either actual or potential, has been in the past, and is even now, the most common cause for special legislative action in the direction indicated. The presence of yellow fever in Boston in 1789[1] was the cause of the establishment of the board of health in the following year. The board of health in Philadelphia in 1794 was the result of smallpox in 1793.[2] The health department in Providence was organized in 1856 as a result of the cholera epidemic in the preceding year, and the Chicago board of health was established in 1867 in consequence of the interest in sanitary affairs created by cholera in 1866.[3] Yellow fever in Memphis not only resulted in the formation of a well organized health department, but caused the revocation of the city charter and a reorganization of the city government. The reorganization of the Detroit health department in 1895 was due to an extensive outbreak of scarlet fever and diphtheria.

II. General Sanitary Legislation for Sanitary Organization.

In the early history of public sanitation in this country most of the legislation would naturally be of a special and local character, called for by special events, and fitted for certain localities, usually the more populous centres. General laws for the establishment of local sanitary authority only came with the development of popular interest in sanitary affairs. The growth of public sentiment in this direction has been greatly favored by the establishment of state boards of health. These boards have done much to produce a demand for local sanitary organization and to shape the laws to effect it. At the present time, much the larger part of our population is under general sanitary legislation; and this is true of even the largest cities, for the tendency towards uniform methods of municipal incorporation is yearly wiping out old charters and special acts and making general laws of incorporation in their place.

[1] Report of the Sanitary Commission of Massachusetts, 1850, p. 72.

[2] Philadelphia, Report of the Board of Health, 1895, p. 150.

[3] Chicago, Report of the Board of Health 1867-9, pp. 118-121.

From the above it will be seen that twenty-three states have general laws for the organization of county boards of health. In all but California still greater uniformity is secured by making such organization obligatory. County organization is almost invariably under general laws. Some of the few exceptions have been noticed as San Francisco County in California, Escambia and Franklin Counties in Florida, Jackson County in Mississippi, and Hudson County in New Jersey.

For township boards of health also it will be found that general legislation prevails. The number of townships in most of the states is very large, and the importance of the individual township is not very great; moreover the similar character of many townships lends itself to general legislation. Hence in nearly every state in which the township system is at all well established, general laws are found providing for township boards of health. There are such laws in fifteen states, and in all they are mandatory.

Besides county or township boards of health, thirty-one states provide general laws for the municipal health organization in cities, towns, boroughs or villages.

III. General Legislation which Incidentally Confers Sanitary Powers.

While both general and special legislation establishing local sanitary authority define to a greater or less extent the powers and duties of such authority, it often happens that much of this power is derived from other laws having specific objects in view, and which simply make use of the existing sanitary organization or perhaps other departments or officers, for executive purposes. Thus quarantine laws have from time to time since 1699 been enacted by the different maritime colonies and states. Such laws usually impose duties upon and grant powers to the local officials of seaport towns and cities, or in many cases impose these duties on state officers. Laws for the prevention of communicable disease, for the abatement of nuisances, for the prevention of the adulteration of foods, and for many similar purposes, usually rely for their execution upon the local government. When the local government has an established board of health or other sanitary organization, it is usually upon such that the duty of enforcing the law is placed. It is from such laws that much of the power of the board of health is derived.

Laws for establishing boards of health provide for their organization, their membership, election, terms of office, the appointment of subordinates and the like, all of which matters will be duly considered. Sometimes the statute does little more than scarcely giving any powers or defining any duties. Laws for the county boards of health

established in Kansas the only duties prescribed by the statute are by implication, that the health officer appointed by the county board of health shall transmit to and from the the state board of health forms for the registration of vital statistics. But generally the law providing for a health organization defines its powers more or less explicitly, though many additional powers and duties may be provided for incidently in other statutes or by special legislation.

The powers which may be conferred upon a board of health are very great. They belong to the general police powers of the state, but it is not the purpose here to discuss their nature or extent. It is rather the purpose to consider what are the powers and duties with which the various state legislatures have invested the local sanitary organization within their jurisdiction, as well as the nature of the organization, and the channels through which the power is conferred. Most sanitary organizations perform functions which belong in a certain sense to the three great spheres of governmental activity, the executive, legislative, and judicial. Primarily the board of health is to see to the enforcement of law. Its chief function is executive, but it happens that the subjects with which it deals require such technical knowledge, and the conditions vary so rapidly with the advance of science, that it is often deemed wise that boards of health should be empowered to make rules in regard to certain matters, such as quarantine and the management of contagious disease, such rules to have the force of law. Then again, the local sanitary authority frequently exercises semi-judicial powers as when it determines the fact of a nuisance, or the offensiveness of a trade. Our purpose now is to consider the laws by which these great and varied powers are conferred. Sometimes the powers and duties are provided for in the most general way and again they are enumerated with the greatest detail and exactness.

The following are instances where the law is expressed in very general terms. In Providence the city council may make ordinances "in regard to health and the prevention and abatement of nuisances." In North Carolina cities and towns may "make such regulations, pay such fees and salaries and impose such penalties as in their judgment may be necessary for the protection and the advancement of the public health." The health department of Baltimore is organized chiefly under the charter which gives the mayor and council power "to pass ordinances to preserve the health of the city." In Massachusetts[1] the board of health of a town "shall make such regulations as it judges necessary for the public health and safety, respecting nuisances, sources of filth, and causes of sickness."

[1] Massachusetts Public Statutes, 1882, Chapter 80, Sec. 18.

Legislatures [illegible] government, seem to have taken [illegible] form in which their acts [illegible] instances above cited, the acts [illegible] their grant of powers. That [illegible] are sufficient to meet all emer- [illegible] See [illegible] Baltimore 61 Md. 259. Other [illegible] this view: but generally [illegible] laws of broad scope, but [illegible] powers which local govern- [illegible] them as closely as possible their [illegible] and prescribe with exactness the manner in which they shall be exercised. In providing for the department of health, the legislature generally adds to a general grant of power, prescriptions as to the form of organization, and enumerates at lesser or greater length the various powers which are conferred and the duties imposed. Thus acts of every variety of extent and complexity of detail are found varying from a few lines to many pages. These different ways of regarding the form of legislation do not seem to depend much upon either time or place. Some of the most general provisions were among the earliest, as the act for establishing boards of health in Massachusetts in 1797 and the charters of Providence and Baltimore which were among the earliest to provide for the regulation of sanitary affairs; but recently the same broad legislation is seen in Kansas, Kentucky, North Carolina, and several western states. On the other hand, recent acts for the organization of cities of the first class in Indiana occupy about two pages in the bare enumeration of powers concerning sanitary affairs. The same detail is seen in the charter of Buffalo 1891, in the act of 1895 establishing a bureau of health in Pennsylvania cities of the second class, and the act of 1895 establishing a board of health in Detroit is one of the best examples of the control of the legislature over the details of [illegible] affairs. This act covers nearly fourteen pages. It [illegible] be said that there is an increasing tendency of [illegible] legislature to legislate more in detail in regard to [illegible] is done it is doubtless due to an increased [illegible] matters. Probably the tendency of legislation in [illegible] be said to be the other way. Special charters and [illegible] laws of late are apt to provide merely for the [illegible] organization, and leave its powers and duties to [illegible] legislation appertaining to these matters. The present [illegible] and San Francisco may be cited as [illegible]

I. Form of the Local Sanitary Organization.

1. *Ex-officio* Boards and Officers. The legislature very frequently makes use of already existing officers to administer sanitary laws; how frequently is shown by a glance at the state legislation that has been thus far summarized. Colorado, Idaho, Indiana, Kansas, Maryland, Montana, Tennessee Washington and Wyoming have *ex-officio* county boards of health, with the addition in Kansas, Idaho, and Montana of one or more physicians. Illinois, Iowa, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont and Wisconsin have *ex-officio* township boards of health, New York and New Jersey having one citizen in addition. In Colorado, Iowa, Louisiana, Michigan, Nebraska, Rhode Island, and Vermont, general laws provide that the cities shall have *ex-officio* boards of health. Moreover, many of the Ohio cities have *ex-officio* boards; thus in Cincinnati the board of administration is the board of health. In New York the mayor of cities is a member of the board of health unless otherwise provided, and the same is true in many cities with special charters. There are other instances also where special charters provide for the membership of certain officials on the board of health. Below are mentioned some of the officials who are found on boards of health.[1]

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[1] Asheville, N. C. Mayor, City Engineer, and Chairman of Committee on Finance.

Atlanta. Mayor and Chairman of Sanitary Committee of Council.

Buffalo. Mayor and President of Board of Public Works.

Grand Rapids. Mayor and President of Council.

Jersey City. Board of Police Commissioners (three in number), the Health Inspector and one City Physician appointed by President of Board of Police Commissioners.

Kansas City. City Physician, Chief of Police and Chief of Fire Department.

Knoxville. Mayor and Chairman of Board of Public Works.

Macon. Mayor, Chairman of Cemetery Committee of Council and Clerk of Council.

Memphis. Mayor, Chief of Police.

Nashville. Chairman of Board of Public Works.

New York. Health Officer of Port and President Board of Police.

North Dakota Cities. Four aldermen appointed by the Mayor, the City Engineer, and the health officer who is appointed by the mayor.

Omaha. Mayor, Chief of Police, Chairman of Committee on Sewers, Chairman of Committee on Streets and Alleys, and Inspector of Plumbing.

Portland, Ore. Mayor, Chairman of Committee on Health and Police of Common Council, Chief of Police, City Physician, and the Health Commissioner.

Philadelphia. Mayor and the Director of Public Safety.

Raleigh. Mayor, two Aldermen, Chief of Police, City Attorney and City Clerk.

Rochester and Somersworth, N. H. City Physician, Overseer of the Poor and Sanitary Officer.

Rockville, Ill. Commissioner of Health, Mayor and Chief of Police.

St. Paul. Chief of Police, City Solicitor and Commissioner of Health.

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more the commissioner of health is appointed by the mayor but acts under the department of public safety. In Cleveland and Toledo the department of police has charge of all matters relating to the public health. The department of police is in charge of a director appointed by the mayor in whom are vested all the duties and powers of the former board of health. In certain cases, particularly among the larger cities another form of sanitary organization has been developed. In these cities the health department is a single-headed department. The tendency of city government at the present time is towards single-headed departments, but this plan has been extended to the health department perhaps less than to any other. It is probably because in this department are usually lodged great legislative as well as executive powers and it is not in accord with American notions to give much legislative power to one man; and, indeed, it usually happens that when a health commissioner is appointed, his power in this direction is limited or denied entirely, being reserved to the proper legislative branch of the city government. Among the cities with a single-headed department are Baltimore, Chicago, Colorado Springs, Denver, the District of Columbia, Milwaukee, Minneapolis, New York and Pennsylvania cities of the second class, and also a number of the smaller Wisconsin and Connecticut cities.

In Brooklyn formerly the health commissioner was appointed by the mayor for a term of two years. He was not only the executive head of the health department, appointing all subordinates and enforcing the laws and ordinances, but he had also "power to act in a legislative capacity in regard to all matters pertaining to the public health." He possessed this legislative power however, only co-ordinately with the council by whom all ordinances prepared by him were to be approved before they become a law; and the law read "No ordinance so prepared and approved shall be repealed or amended without the approval of the health commissioner." In Milwaukee, the health commissioner is to "provide rules and regulations" to be approved by the common council, but it does not appear that he has the quasi veto power which the Brooklyn commissioner possessed. In Chicago, Baltimore, District of Columbia and Denver the commissioner is simply the executive officer in charge of sanitary affairs. He has little or no legislative powers these being vested in other branches of the city government or in the case of the District of Columbia in Congress. In Denver and Colorado Springs the possible disadvantages of "one man power" are met, or attempted to be, by the unique arrangement of an advisory board of health. This board is extra-legal and is appointed by the health commissioner. In Denver it is frequently called together by him and its advice is considered of great value. It was the intention in that city

that the health department should be a bureau in the department of public safety, the board of public safety to consist of the health commissioner and the commissioners of fire, police inspection and excise, but for many years that department has had no meeting.[1] In Richmond, Va. there is an advisory board of health in addition to the regularly established board.

While there are not very many cities in which the sanitary powers are formally conferred upon one man, there are many cities including some of the most important in which this is practically the result of the existing organization. This is true of those cities in which the health department is a bureau in the department of public safety. In Cleveland and Cincinnati the department is practically single-headed, and in many cities with independent boards of health it is often the case that a single member, or perhaps the executive officer appointed by the board, practically controls all its action. In some of these cities the other members of the board are a hindrance rather than a help to the one efficient officer. In smaller communities especially when the city or township council, or county commissioners are *ex-officio* the board of health, the health officer appointed by the board really performs all the necessary functions of the department, except that of legislation. It may thus be fairly stated that while nominally a single-headed health department is not very common, as a matter of fact efficiency is in the majority of cases throughout the United States secured only by allowing one man to control sanitary affairs. A single health officer without legislative power is by most state officials of experience, considered more efficient than a board of health.

11 Appointment of Members.

Wherever there is an independent board of health it must be either elected or appointed. In almost all cases its membership is made up by the latter method, though until 1897 the South Carolina law provided that the board of health of cities, towns, and villages should be elected by the freeholders. In Massachusetts "the town at the annual meeting or a special meeting called for the purpose may choose by ballot a board of health."

In a few instances the local board of health is appointed by the governor of the state. This is true of the county board of health in Delaware and of Jackson County in Mississippi. In certain cities, too as in Shreveport and Baton Rouge, La., and in San Francisco (until 1900), and in Detroit

[1] Eleventh Report of Bureau of Health, 1895, p. 7.

In Connecticut the county health officers are appointed by the Supreme Court. In West Virginia, Mississippi, and North and South Dakota the county board is appointed by the state board.

In Vermont the state board of health appoints the health officer who is *ex-officio* a member of the local board of health.

The control of the state authorities in these appointments is, however, very exceptional, and almost always the appointment of the local board of health is in the hands of the local government, either county or municipal. In most states the county boards are *ex-officio* boards, but in Texas the county health officer is appointed by the county judge. In California the county board of health is appointed by the supervisors, and in Idaho, Montana, and Kansas the board of health consists of the county boards with the addition of one physican appointed by the board. Township boards of health also are usually *ex-officio* boards though sometimes with the addition of another member usually a physician appointed by the board as in New York, New Jersey, and Minnesota; but in Maine the "Municipal officers" of towns (townships) and in New Hampshire the selectmen are required to appoint a board of health, and in Rhode Island the town council is permitted to do so.

It is in municipalities, particularly the larger, that independent boards of health are most common, and here they are usually appointive. In New Hampshire, Delaware, Ohio, Arkansas, Minnesota, Kentucky, and California the general laws provide that the city board of health shall be appointed by the "council," "common council," or "city council" as the case may be. In Massachusetts the mayor and board of aldermen conjointly, and in New York, Wisconsin, North Carolina, Arkansas, and Pennsylvania in cities of the third class and in boroughs the mayor and council have the appointing power. In Indiana in the classified cities the commissioners of health and charities are appointed by the mayor, and in Wisconsin the commissioner of health is appointed by the mayor. In Texas the board of health of towns and villages is appointed by the county commissioners. In New Mexico the county commissioners may appoint health officers for towns, and in California they must do so for unincorporated towns of over 500 inhabitants. In Virginia county and municipal boards of health are appointed by the county or municipal judge.

In those cities which have special charters or special acts establishing the department of health, all sorts of methods are in vogue, the tendency being in recent charters to vest the appointing of the head of the health as of all other departments, exclusively in the hands of the mayor. This is true of Charleston, Milwaukee, New Haven, Buffalo, New York, Cleveland, Philadelphia, and San Francisco.

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vania, Indiana, Delaware, South Carolina, Kentucky and California. Usually when there is a single head for the department it is required that he be a physician. It is not always possible to obtain the service of a physician for this office, and so most laws make the provision that a physician shall be appointed if one is available. The California law requires in municipalities the appointment on the board of health, of a civil engineer if possible. Connecticut is the only state that requires that the health officer shall be an attorney.

The disadvantage of having "politics" affect the membership or working of a board of health is of course apparent. It is so apparent that public opinion has made a stronger demand for purity in the health department than in any other department of municipal affairs. A large proportion of health officers are free from the taint of partisanship, though of course there are conspicuous exceptions. Bi-partisanship which is generally recognized as a futile means of combating partisanship, has rarely been tried in the health department. In New Jersey, however, by the act of 15 March, 1894, it was provided that in cities of the first class, the board of health should be bi-partisan.

IV. Details of Organization.

In a number of states the statute makes provision for the organization and meetings of the board of health. Such provisions are found in Minnesota, New York, Ohio, Iowa, South Carolina, New Jersey, Michigan, North Carolina, and North and South Dakota. Among the items prescribed are the dates and frequency of meetings, advertisement of meetings, regulation of terms of service, the election of presiding and recording officers, the keeping of records, taking of oaths and giving of bonds. The following is an example of these laws:[1]

"The members of the board shall severally take and subscribe the oath prescribed for borough officers, and shall annually organize, by the choice of one of their members as president. They shall elect a secretary, who shall keep the minutes of their proceedings, and perform such other duties as may be directed by the board and a health officer, who shall execute the orders of the board, and for that purpose, the said health officer shall have and exercise the powers and authority of a policeman of the borough. The secretary and the health officer shall receive such salary as may be fixed by the board, and shall hold their office during the pleasure of the board. They shall severally give bond to the borough in such sums as may be fixed by ordinance for the faithful discharge of their duties, and shall also take and subscribe the oath required by the members of the board. All fees which shall be collected or received by the board, or by any officer thereof, in his official capacity, shall be paid over into the borough treasury monthly, together with all penalties which shall be recovered for the violation of any regulation of the board. The president and secretary shall have full power to administer oaths or affirmations, in any proceedings or investigations touching the regulations of the board, but shall not be entitled to receive any fees therefor."

[1] Pennsylvania, Chapter 42 of 1893, Sec. 3. Breghtly's Purdon's Digest (1894), p. 256.

The matters referred to above are generally left largely, if not entirely, to the discretion of the local sanitary authority. Rules and by-laws are usually adopted by boards of health to govern them in the conduct of their affairs. Such by-laws may cover such subjects as: 1. The appointment or election of officers as president, secretary or clerk, treasurer, etc. 2. The appointment of employees and terms of service of these. 3. The duties of all officers and employees. 4. The appointment of committees and their duties. 5. Time and manner of calling meetings. 6. Order of business and similar parliamentary rules. 7. Manner of adopting rules and orders. 8. Office rules for business hours, etc. It often happens that some of the above matters are dealt with by statute, and others left to the local government, or they may be covered by municipal ordinance. Regulations for the appointment and duties of officers are perhaps more often to be found in statute or ordinance, than in by-laws, but the other subjects are usually left to the sanitary department. References to some of these by-laws are given below.[1]

1. *Terms of Office.*

It is natural that the terms of office of sanitary officials should vary very much. Unfortunately the idea that fitness is a matter to be at all considered in appointments to office is a somewhat rare notion among the every day citizen as well as among those who are active in political life; and the idea that fitness can be acquired and increased by service is still more rare. The common notion is that one man is as good as another, and that in a democracy everybody ought to have a chance at public honor and emolument. Hence short terms of office are found in many boards of health, far oftener, however, in the *ex-officio* boards than in the independent boards, and oftener in former times than at present. A lengthened term of service for minor executive officers is one line of improvement which American politics are following. This change showed itself as early in the sanitary department as anywhere. The importance of keeping the department of public health free from "politics" has been very generally recognized, and also the necessity of hav-

[1] Albany — Rules of Board of Health, 1892, 1–24.
Augusta, Ga. — Rules of Board of Health, 1888, 1–23.
Camden — Rules of Board of Health, 1890, 1–16.
Carmichaelville, Pa. — Rules of Board of Health, 1894.
Erie — Rules and Regulations of the Board of Health, 1898, pp. 3–9.
Macon, Ga. — By-Laws of Board of Health, 1894, pp. 5–12.
Oswego — Rules of Board of Health, 1890.
Philadelphia — Rules of Board of Health, 1895, 1–30 and 198–9.
Syracuse — Rules and Regulations of the Board of Health, 1898, 1–27.

ing trained and experienced men at its head. A long term of office has been considered a means to these ends. Maine, Massachusetts, New York, Ohio, Minnesota, and Kentucky, prescribe three years for their municipal boards of health. Connecticut health officers are appointed for four years and the terms of members of the municipal board of health in Pennsylvania and South Carolina is five years. In the new charter for New York cities of the second class, the term of office of the health officer is for good behavior. Some of our best sanitary officials have been in office for a long time. The writer's predecessor, Dr. Snow of Providence, was in office from 1856 to 1884. Dr. Durgin has been an employee of the Boston board of health since 1867, and secretary of the board since 1873; Dr. Horlbeck has been health officer of Charleston since 1879. Mr. Gray has been connected with the Pittsburgh health department for twenty-five years, and has been superintendent of the bureau since 1888.

Another means of securing intelligent and consistent action in sanitary affairs, is to so arrange appointments to the board of health, that only a part of the membership can be changed at any one time. Thus, if there are three members with terms of three years, one may be appointed each year. This arrangement is prescribed in the statute establishing municipal boards of health in Maine, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Minnesota, South Carolina, and Kentucky, and in various special acts and charters.

VI. Compensation.

A very large portion of the country has its sanitary affairs presided over by *ex-officio* boards of health, and as a rule its members receive no extra compensation for their services as health officials. This is not, however, always the case. In New Jersey, members of township boards of health are to receive $2 for each meeting attended. Even where there are independent boards of health, it is probably the rule for them to serve for nothing in most of the smaller communities and even in some of the larger. But in the city of New York, the president of the board of health receives $7,000, and the others $6,000 per annum. In Boston, the members receives $4,000; in St. Louis, $500; in New Bedford, $500; in Lynn, $300; in Fitchburg, $300; in Atlanta, $100; and in Wilmington, Del., $100.

The work of the local sanitary organization, while primarily and chiefly executive, also usually includes legislative functions, and what may perhaps be called judicial functions also.

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[1] See p. 9.

[2] New York, Chapter [illegible] of 1901, Sec. 1169 and 1183.

local government, that the power to perform them is construed by the courts as residing even in the most general grant of sanitary authority.

Other functions, though perhaps of as much real sanitary value to the community, are not usually performed by the health department unless expressly so provided. Thus, many cities collect and dispose of ashes, night soil, and garbage, but all do not, and in the majority, perhaps, this business is not in the hands of the health department. Street cleaning, sewer maintenance and construction are less frequently controlled by the health department. The maintenance of an out door medical relief is occasionally in the hands of health officials, and very rarely the general public hospitals. The registration of vital statistics while intimately connected with public sanitation, is often in the hands of officials not connected with this department. All these functions and any other novel or unusual action is usually provided for by specific legislative action.

It is not intended here to give a summary of legislation on these subjects, or even to give a complete enumeration of the executive functions of boards of health. Their proper consideration is the purpose of this book and the most important functions will be treated in the different chapters, where also the statute laws on the subject will be referred to.

Subordinate Officers. The appointment of subordinate officers and the hiring of employees is usually in the hands of the board of health, though sometimes, as in Buffalo and North Dakota cities, the appointment of the health officer is made by the mayor. The power to appoint officers and employees may doubtless be assumed as implied in the broader grants of sanitary authority, but very often statutes specifically provide for the appointments. Perhaps in most cases the officers and their manner of appointment are specifically mentioned. In other cases the authority to appoint subordinates is general. The Minnesota[1] law is shown below.

Of all employees the health officer is the most important. As has been shown, almost all counties, townships, and municipalities are provided with a board of health consisting of three or more members and invested with very great powers, and upon whom are imposed many duties. In small communities, especially rural communities, the actual

[1] Minnesota, Statutes (1894), Sec. 7072:

"Said Boards of Health may employ all such persons as shall be necessary to carry into effect the provisions of this act and the regulations duly established by said Boards as herein provided, and may fix their compensation. The said Boards shall have power to employ physicians and provide necessaries for persons in cases of poverty, and generally to pay such expenses as are necessarily incurred by them in taking precautions which they may deem necessary to the public health."

labor which they are usually called upon to perform is not very great, and oftentimes is divided among the members without the necessity of other assistance. This is the more feasible when one or more medical men are upon the board; but in nearly all but the smaller communities, and sometimes even there it is felt that the interests of the public will be best conserved by having a special officer who shall be the executive of the board and do all but its legislative and judicial work, and oftentimes some of the latter. As a general thing it is intended that the board of health shall make rules, issue orders, and decide on matters of general policy, but that the actual executive and administrative work shall be performed by one or more appointees or employees. Such an officer, if there is only one, is commonly called the health officer, and in most counties, townships, villages, and small cities suffices to carry on the sanitary work, but in the larger cities his labors have to be reinforced by that of others until in our largest cities the department of health has a great number of officers, inspectors, and other employees. In the states named below[1] it is required by the statute that there shall be county or township health officers; besides these, many of the municipal laws and charters have this requirement. Almost always he is called a health officer, but sometimes he has other titles as shown below.[2] Usually the health officer is not a member of the board, but this is not always the case. In North Carolina, North Dakota, and West Virginia, the health officer is a member of the county board, and in Wisconsin he is *ex-officio* member of the board of health of cities, townships, and villages. In Vermont he is a member of all local boards. In many cities, also, the health officer or commissioner is a member of the board. Among these may be mentioned Buffalo, Jersey City, Kansas City, Knoxville, Memphis, Omaha, Paterson, St. Louis, San Antonio, and Scranton.

The health officer is usually elected by the board of health as is provided by the statute in many of the states. But sometimes the

[1] Alabama, Colorado, Connecticut, Iowa, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, North Carolina, North Dakota, Ohio, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin and Wyoming.

[2] In many Massachusetts cities such an executive is known as the agent of the board of health. In the city of New York he is the sanitary superintendent. In Providence, North Dakota counties and in North Carolina, he is the superintendent of health. Newark makes use of the English term, medical officer of health. In Newport and Wilmington, Del., he is the executive officer. In Knoxville his duties are performed by the secretary, who is a member of the board of health. He is sometimes, as in Buffalo, Omaha, and Reading, called the commissioner of health. He is the superintendent of the bureau of health in Allegheny and Pittsburgh, and city sanitarian in Indianapolis. In Jersey City he is known as "sanitary inspector." In Worcester the clerk of the board of health is the executive officer.

executive officer is not elected by the board of health which he serves. Thus in Buffalo the health commissioner is appointed by the mayor. In Charleston and Providence he is elected by the city council, although in the latter city the board of aldermen is the board of health and in the former there is an independent board of health. In Maine cities he is elected by the "municipal officers."

The qualifications of the executive officer are sometimes prescribed by statute. Usually he must be a physician or licensed physician. The Connecticut[1] law requires that he must be "learned in medical and sanitary science." In Indiana[2] he shall be "a graduate of a reputable medical college recognized by the State Board of Medical Registration and Examination who if not already informed in hygiene and sanitary science shall immediately inform himself according to the requirements of the State Board of Health." In Buffalo the executive officer must be thirty years of age and have been a practising physician for five years. In the City of New York the sanitary superintendent must have been practising ten years and have been a resident of the city three years. Sometimes, especially in the smaller communities, it is not possible to secure the services of a physician, and laymen are sometimes appointed even to places of great responsibility. The very efficient health officer of Pittsburgh is not a physician, and Worcester and Newton, Mass., Newark and Montclair, N. J., have non-medical men as the executives of the health department, and in all these places they have done unusually excellent sanitary work.

The terms of office for the executive sanitary officer vary as do the terms of office of the other sanitary officials, and the members of the board of health. The tendency is undoubtedly towards longer terms of service. In Buffalo it is five years; in Baltimore, Charleston, Connecticut, and Indiana, four years; in Providence, three years. In Cincinnati, Newark, and New York cities of the second class, the term of office of the health officer is indeterminate, but of course he is removable for cause.

A great many health officers receive no compensation at all but serve their fellow-citizens simply from public spirit. Thus in Minnesota in 1898, of 214 health officers, eighty-three received no pay, and one of these was in a city of 5,000 inhabitants.[3] In Alabama none of the county health officers and their assistants receive pay.[4] In Wisconsin, of 694 health officers, 342 had no salary,[5] only two were

[1] Connecticut, Chapter 148 of 1893, Sec. 6.

[2] Indiana, Act of 19 February, 1899, Sec. 8.

[3] Minnesota Report of State Board of Health, 1898, p. 402.

[4] Alabama Report of State Medical Society, 1894, p. 62.

[5] Wisconsin Report of the State Board of Health, 1897-8, p. 129.

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In villages, towns, and cities of small or moderate size, the health officer is expected to do nearly all of the sanitary work of the community. He acts as the secretary of the board of health, attends personally to communicable diseases, puts up placards, gives instructions, and often does the disinfection himself. He investigates nuisances and prepares the orders which are passed by the board, often serves them, and sees that they are obeyed. With increase in the size of the city come increased duties, the collection of garbage, the care of sick poor, a communicable disease hospital, the registration of vital statistics, and the supervision of the food supply. It becomes manifestly impossible for a single man, even if he devotes his whole time to the work, to attend to all the sanitary duties pertaining to the department. The appointment of subordinates becomes necessary and the health officer then does less of the detail work but attends chiefly to its superintendence. In cities of 100,000 and over, if the department of health is even fairly well organized and supported, the duties of the health officer are almost exclusively those of directing, the details being carried out by clerks and inspectors. For examples of rules governing health officers of cities see the printed ordinances and regulations of Charleston, Cincinnati, Cleveland, Denver, Mobile, and St. Louis.

The secretary as well as the president is provided for in *ex-officio* boards, but otherwise is usually elected, though not always. Thus Bridgeport and Utica which have an independent board, have the city clerk for clerk of the board. In Jersey City the clerk of the board of police commissioners is clerk of the board of health. When chosen, the secretary, unlike the health officer, is more often a member of the board. In small communities his duties would be light, and he would serve without compensation as do the other members. In larger communities the duties are often performed by the health officer, and often the secretary is an appointee of the board with duties sufficient to require a salary. In such cases he is often more properly termed a clerk than a secretary.

Among important assistants of the health officer may be mentioned sanitary and medical inspectors, inspectors of food and milk, clerks or registrars of vital statistics, chemists and bacteriologists.

All the officials that have been mentioned may be reasonably looked for in cities of 100,000 and over, and they are often found in much smaller communities. The varying development of different phases of sanitary work in different cities has resulted in the appointment of officials in one city that are unknown in other cities of much greater size. Moreover, different local conditions due to geographical position, industries and character of population, and the notions of the people

in regard to the functions of municipal government, result in the employment in isolated instances of any one of a considerable number of officials that have not yet been mentioned.

Thus cities which are ports of entry for foreign commerce, and where the state does not control quarantine, require a port physician or similar officer, and in larger ports the establishment of a complete system of quarantine, with boarding officers, physicians, hospital attendants, disinfectors, boatmen and the like.

Again, some cities consolidate sanitary work with the care of the sick poor, perhaps putting even the hospitals and almshouses in charge of the health department, and thus requiring in addition to physicians, the employment of a large force of nurses, stewards, apothecaries, maids, watchmen, etc. Brooklyn, Colorado Springs, Indianapolis, Jersey City, St. Louis, San Francisco, and Spokane are examples. Other cities which do not have their general hospitals under the health department may yet have their contagious disease hospitals in that department. In fact this is almost always the case, and in large cities this necessitates a considerable force of officers and employees.

In some cities, as Atlanta, Denver, and Raleigh, the street cleaning, and in many more the collection and disposal of garbage and ashes, and in some of night soil, is carried on by the health department.

In those sections of the country where much bituminous coal is consumed, the smoke nuisance receives attention, and the duty of smoke inspection may belong to the health department.

In Augusta and Memphis the sewer department is within the jurisdiction of the board of health which has charge of the construction as well as the maintenance of the sewers.

The legal adviser for most health departments is the city, town, or county attorney. The amount of legal work in some of the largest cities, however, renders it necessary that one or more special attorneys be employed for this department. Such special attorneys are found in Cincinnati, New York, Newark, Paterson, Hoboken, and other New Jersey cities, and in even as small a place as Montclair, N. J. Occasionally it happens that a board of health in smaller places employs its own attorney for each case as the necessity arises. Such is the policy in Cambridge. The law department in most cities usually has plenty of work, and its time is largely taken up with the defence of suits, the preparation of legal papers and similar matters, and prosecutions usually receive only such attention as can be spared from other work. As the health department is usually on the offensive rather than the defensive, better results can be expected when the department has its own attorney. Thus the executive force of the health department may

consist of a single health officer who performs all the duties of his department. This is the rule in the vast number of smaller communities throughout the county; but as we pass to larger aggregations of people we find that the work of sanitary administration increases until in the large cities it necessitates quite an army of officials.

In the city of New York since consolidation, a unique division of the health department has been made, necessitated by the great size and peculiar geography of the city. There are two bureaus in the department, one to be presided over by the registrar of records, and which is virtually a bureau of vital statistics, and the other presided over by a sanitary superintendent, and which bureau is to perform all other sanitary functions than those relating to registration. For each of the five boroughs the board of health is to establish borough offices, for each of which is appointed an assistant sanitary superintendent and assistant registrar of records. These local officers transact the business and keep the records for their respective buroughs, but all act under the direction of the central board of health which has its office in Manhattan. The sanitary superintendent and his five assistants are the executive officers of the board of health.

Officers and employees other than the health officer are almost always appointed by the board of health if there is a board of health. When there is a single head to the department he sometimes has the entire appointing power, as in Buffalo,[1] or more often exercises this power conjointly. In St. Louis the appointments of the health commissioner are to be confirmed by the board of health, and in Chicago and Denver by the mayor.

Bonds. Bonds are not infrequently required of the officers of the health department. In St. Louis the health commissioner has to furnish bonds in the sum of $10,000. In Chicago the amount is $5,000. Subordinate officers also sometimes have to give bonds. In Cincinnati the amount required of the registrar of vital statistics, of the inspector of meat, of the milk inspector, and the sanitary superintendent, is $2,000. In smaller cities health officers' and inspectors' bonds in the sum of $500 or $1,000 are sometimes required.

The time devoted by the health officer and other sanitary officials to the duties of their department varies very much. In country districts and in villages and small cities, the health officer is usually engaged most of his time in active practice, if he is a physician. Except in emergencies, he is able to satisfactorily perform his duties without materially encroaching on the time devoted to his private affairs. In

[1] New York, Chapter 105 of 1891, Secs. 234-5.

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[illegible] discharge their duties, sanitary officials [illegible] of those with whom they have to [illegible] personal suits for fancied injuries. The [illegible] three such suits within a short time while at- [illegible] the spread of a diphtheria outbreak. To prevent [illegible] liability the section given below was enacted in the [illegible] the city of New York.[3]

[illegible] at least, in Charleston, the health officer is liable to [illegible] duties. He is to pay $10 for each [illegible] to a complaint of a nuisance, and the amount of the [illegible] out of his salary.[4]

New York, [illegible] 189[illegible]

[illegible] No member, officer or agents of said department of health, and no [illegible] other than the department of health or the city itself, shall be [illegible] for any act done or omitted by either person aforesaid, in good faith [illegible] on behalf of or under said department, or [illegible] health laws. And any person whose prop- [illegible] destroyed or injured, pursuant to any [illegible] of said department of health or its officers, [illegible] may maintain a proper action [illegible] compensation or damage. Every such [illegible] the cause of action arose, and the re- [illegible]

[illegible]

Civil Service Regulations. The principles of civil service reform have been crystallized in the laws of several states and cities. These laws are made to apply to the department of health as to all other departments, and appointments whether made by commissioner, health officer, or board of health, must be in accordance with these rules.

Modern civil service rules involve a certain permanency of tenure of office. Permanency in office should imply a moderate compensation, and it does imply ultimate disability for the performance of duty. Hence the development of a pension idea as the tenure of office of employees becomes more secure. A pension fund is provided for by Secs. 1331 to 1337 of the charter of the city of New York. The fund consists of the moneys received for searches and transcripts of births, marriages, and deaths, and from fines. The board of health is the trustee of this fund and reports annually to the mayor. A pension consisting of half pay, is given to any physician or other person employed about communicable disease, who shall become permanently disabled "while in the actual performance of his duty and without fault or misconduct on his part." In case of death, $300 per annum is to be paid to his family. Employees, after twenty years' service, may be retired on half pay.

Civil service reform requires a certain degree of fitness in candidates for official positions, and this fitness is to be determined by examination. Unfortunately most appointees to official sanitary positions in the United States, are entirely untrained for the duties they are to perform. To exhibit some degree of natural ability is all that is asked, and often this is not required, the sole qualification of the appointee being his political service to the party which has the appointing power. In England, considerable attention is paid to the education of sanitary officials, but it is only just beginning to be thought of in this country. With the growth of the reform principle, there is sure to come in the United States a demand for trained officials. Even now some far-sighted persons are preparing for this demand. Rutgers College and the Ohio State University offer courses of instruction for health officers and sanitary inspectors, and give certificates to candidates on successfully passing examination. Lafayette College has a course in hygiene, and the University of Pennsylvania has for some years offered a most excellent course. Unfortunately these courses are not taken by men who intend to fill sanitary positions, and they will not be so long as it is known that the successful candidate needs no other recommendation than that of "influential" friends.

Among other rules commonly found in sanitary codes, is one which forbids the offering of any obstruction to the health officer or other em-

ployees of the sanitary department. As we shall see, the proper officers are frequently by statute given authority to enter upon private property in the performance of their sanitary duties, and all persons are warned not to obstruct them. Often this protection is extended so as to forbid interference with any of the authorized functions of this department of municipal administration.[1]

One of the duties of the local sanitary authority is to make reports to the local government and to the state government. The local ordinances usually provide that the board of health, like all other departments, shall report annually to the trustees, council, mayor, or some other body or officer. Reports to the state board of health are also usually required. Sometimes this requirement is found in the act establishing the local board, but more often in the act establishing the state board. Most of the laws require annual reports and some require them more frequently, and others prescribe that special reports shall be made when demanded by the state authorities. For the annual reports to the state board, printed schedules are often furnished. The one used in Pennsylvania is given in Appendix 1. This subject will be further considered in the chapter on registration, and in the last chapter.

II. Legislative Functions.

Most local sanitary authorities are given legislative powers. Sometimes such legislative power is very broad and extensive, and sometimes it is very limited. Sometimes it is conferred upon the state board of health rather than upon local boards, and sometimes both the state and local boards hold it, each to exercise it under certain conditions. Some of the states in which the state board has legislative power are mentioned below.[2] The power thus given is often limited, frequently to the management of contagious disease. In other cases, as in Florida, Louisiana, Mississippi; New Hampshire, North Dakota, and South Dakota, it is very general. In Virginia it can be exercised only in

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[1] Denver, Ordinances, 44 of 1893, Sec. 12:

"SEC. 12. It shall be unlawful for any person or persons to molest, hinder, interfere with or in any manner prevent the said health commissioner, or any individual engaged in the bureau of health of the city, from performing any duty imposed upon him or made by any law of the city or state or any rule of the said commissioner; nor shall anyone interfere with him in any acts done to prevent the spread of contagious diseases, or with any employee of the bureau of health in carrying out any direction of the health commissioner in enforcing any of the laws and ordinances of the city in reference to health."

[2] Florida, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Missouri, New Hampshire, New York, North Carolina, North Dakota, Ohio, Pennsylvania, South Dakota, Tennessee, Vermont, Virginia, Wisconsin.

epidemics; in Pennsylvania only where there is no local board; in North and South Dakota the local board can make rules only under the supervision of the state board, and in North Carolina the state board can make rules only during epidemics or where there is no local board. In New York and Virginia the state board of health may modify or amend a local regulation if in its opinion it affects other communities.

A recent decision of the supreme court of Wisconsin has, however, affirmed that the state board of health being appointive and not a representative body, cannot be clothed with legislative power.[1]

Most states, in the laws establishing local sanitary authority, provide for the exercise by that authority of legislative powers, and the same provision is found in most special charters. Whenever an independent board of health is established, power to legislate is generally conferred upon it; but this is not always the case. In some localities, even where the principle of local independence in sanitary affairs is admitted, legislative power in such affairs is given to a branch of the city government other than the board of health or health officer on whom is conferred the executive powers. Thus at Bridgeport, although there is an established board of health, the city council alone is competent to legislate on sanitary affairs. In Richmond it is the city council, in Memphis the legislative council, and in San Francisco the board of supervisors, and in Baltimore it is the mayor and city council that are invested with legislative powers, although in each of these cities there is a separate board of health. Besides these and other cities provided for by special charter, there are a number of states in which legislative power in regard to sanitary matters is conferred on the proper legislative department of the cities. This is true in Illinois, Indiana, Kansas, Kentucky, Missouri, Nebraska, North Carolina, and Texas, though there are special charters in some of these states making other provisions. Where there is no local board of health, and only a single health commissioner or health officer, such officer is not usually given legislative powers, or if so, only to a limited extent. Thus in the District of Columbia the health officer can only make rules in regard to the protection of the milk supply. The commissioners of the District of Columbia have some legislative authority in regard to plumbing, garbage, communicable disease and sanitary affairs generally, but Congress has not given them a very free rein.

In Chicago the commissioner of health has no legislative power, nor have the superintendents of the bureaus in Pittsburg and Allegheny, or

[1] Wisconsin Supreme Court, 23 February, 1897, State *ex rel.* Adams *vs.* Burge, *et al.*, School Board. See also Illinois Supreme Court, 10 May, 1897, Potts *et al. vs.* Breen *et al.*, and Illinois Supreme Court, 17 February, 1899, People *ex rel.*, Labaugh *vs.* Board of Education of District No. 2.

the health officer in Cleveland. In other cities the health officer acts in conjunction with the proper legislative branch of the city government. In Buffalo,[1] where there is nominally a board of health, but practically a single head, the health commissioner is to make rules for carrying out ordinances and

"To propose such ordinances as he shall deem to be required for the protection of the public health and for securing the proper registration of births, marriages and deaths, and such other statistical material as may be necessary for the efficient working of the department with penalties for their violation, which ordinances, when approved by the board, shall be by him submitted to the council, and when approved by said council, shall have the same force and effect as other ordinances of the city. No ordinance so prepared and approved by said common council shall be repealed and annulled without the approval of the health commissioner and board of health, and the common council shall adopt no ordinance relating to governing the matters and things contained in this title, unless the same shall be recommended by the health commissioner and board of health."

In Wisconsin[2]

"The commissioner of public health shall have all the power or authority heretofore given, or which may hereafter be given, to boards of health by any general law of the state, and it shall be his duty to provide such additional rules and regulations as shall be requisite and necessary for the preservation of the health of the people of the city to prevent the spread of contagious diseases, and to cause the removal of all objects detrimental to the health of the people of the city, and to enforce such rules and regulations as are hereinafter provided, etc."

In Connecticut[3] also the health officer has legislative power granted by the following:

"It shall be sufficient notice to all persons of any regulation of the health officer of any town, if it be published in a newspaper published in the town, if there be one, and posted for three days on each sign post in said town; and if any person shall willfully violate such rules after they have been so published and posted, or after actual notice thereof shall have been given to him, he shall be fined not more than one hundred dollars."

It is thus seen that often, perhaps usually, the legislative power granted to a single health officer is subject to limitations by other branches of the local government. Even in the case of regularly established boards of health of several members, its legislative acts often have to be subjected to revision and approval before they may have the force of laws. Thus in Maine[4] the board of health has power

"To make, alter or amend such orders and by-laws as they shall think necessary and proper for the preservation of life and health and the successful operation of the health laws of the state, subject to the approval of any justice of the supreme judicial court."

[1] New York, Chapter 105 of 1891, Sec. 233.

[2] Wisconsin, Statutes (1898), Sec. 925 (-108).

[3] Connecticut, Chapter 164 of 1895.

[4] Maine, Supplement Laws (1895), Chapter 14 (2), Sec. 7.

In New Hampshire the rules of the local health organization must be approved by the selectmen. A similar provision is made in the laws of Pennsylvania and South Carolina.

In North Dakota[1] the board of health is empowered

"To make and enforce any and all needful rules and regulations for the prevention and cure, and to prevent the spread of any contagious, infectious or malarial diseases among persons and domestic animals," " . . . subject to the supervisory control of the state board of health and the superintendent of public health."

Usually the legislative power granted to local sanitary organizations is very great, though occasionally it is limited, especially in single-headed departments. Instances of this have just been given, but true boards of health also sometimes have circumscribed powers. Thus in West Virginia, the county board of health is empowered to legislate only in regard to contagious diseases. In Louisiana[2], the local board of health can pass ordinances

"For the exclusion and repression of contagious and infectious diseases; for defining and abating nuisances dangerous to the public health; for regulating drainage and ventilation with reference to human habitations and places of business and public resort; for the collection and recording of vital statistics."

Sometimes the phraseology of the statutes conferring legislative power is very broad and general, and sometimes it is most specific and limited. Sometimes the power is conferred by almost a single line, and sometimes several pages are required for the specific enumeration of powers conferred. The tendency is rather towards the briefer form, and some of the most important cities are governed by such. The success of such cities as Brooklyn and Baltimore in maintaining in the courts their authority to legislate on sanitary affairs shows that great powers can be conferred by a very concise act. As examples of state laws of a similar character the following may be cited:[3]

"The board of health of a town shall make such regulations as it judges necessary for the public health and safety respecting nuisances, sources of filth and causes of sickness."

This Massachusetts law was enacted in 1797 and has thus for a full century been maintained against all attacks as a competent authority for sanitary legislation on the part of the towns and cities of the commonwealth, and it has been copied almost verbatim in the laws of many other states. Broad provisions therefor are amply sufficient to give to the local sanitary authority all the power necessary for the exercise of its proper functions. It would seem then that when the various powers

[1] North Dakota, Revised Code (1899), Sec. 247.

[2] Louisiana, Chapter 192 of 1898, Sec. 7.

[3] Massachusetts, Public Statutes, Chapter 80, Sec. 18.

[illegible]

[illegible]

[illegible]

In Connecticut if there is no newspaper in the town the rules may be posted on sign posts and entered in the town records.

The board or officer legislating must, of course, have the authority to impose penalties, otherwise the rules and regulations would be useless. Sometimes, as in Rhode Island, the penalty is fixed by the statute authorizing the legislation. In many cases it is fixed by other general statutes regulating the legislative functions of local government. When local boards fix the penalties the maximum and sometimes the minimum is fixed by the statute. The smallest maximum that the writer has noticed is $10 in New Hampshire. Usually the maximum penalty allowed for violations of local sanitary regulations is $100, but sometimes it is $50 and more rarely $25; in Albany, until 1900 it was $1,000. In some cities the fines go into the general treasury, but in others they go to the health department. The alternative of imprisonment for periods up to one year is often allowed.

III. Judicial Functions.

The power and duty of sanitary officials to investigate and abate nuisances is an important part of their functions and implies the exercise of quasi judicial powers. If a nuisance is to be abated through the action of a board of health, it must first of all be determined to be a nuisance, and this question of fact must be decided by the board. Sometimes the question is very easily settled, but often it is not, and occasionally a settlement can only be arrived at after a long and patient investigation. In most of the statutes establishing boards of health this power is only granted by implication in the general grant of powers or in the special provisions for the abatement of nuisances. Sometimes, however, it is specifically recognized and its exercise provided for. The laws of Connecticut[1] and New York[2] furnish examples of this. The New York law provides in regard to the board of health that

"It may issue subpœnas, compel the attendance of witnesses, administer oaths to witnesses and compel them to testify, and for such purposes it shall have the same powers as a justice of the peace of the state in a civil action of which he has jurisdiction. It may designate by resolution one of its members to sign and issue such subpœnas. No subpœnas shall be served outside the jurisdiction of the board issuing it, and no witness shall be interrogated or compelled to testify upon matters not related to the public health."

The powers conferred upon a board of health by statute or ordinance cannot usually be delegated by it. They cannot unless the

[1] Connecticut, Chapter 248 of 1893, Sec. 3.

[2] New York, General Laws (1896), p. 2422, Sec. 4.

authority to do so is expressly granted. Sometimes, as in Rhode Island and Massachusetts, certain executive powers belonging to the board of health are exercised by the health officer, a subordinate official: but this is provided for in the statute. The powers are not delegated by the board. Occasionally the law provides that the powers of the board of health may be delegated. Such authority is given in New Jersey,[1] and in Detroit[2], and in the City of New York[3].

In pursuance of the power to legislate which has been granted them, most boards of health adopt more or less extensive rules for the betterment of the communities under their jurisdiction, and sanitary codes, ordinances, or rules and regulations, are found in almost every community. In the great cities these are often very extensive and cover a wide range of subjects. Almost all legislation, statutory as well as municipal, shows more or less legal and technical ignorance on the part of the framers. It might be expected that boards of health would exhibit such failings in a marked degree, and it is to be feared that they often do. Sanitary ordinances, like all laws, should first of all be reasonable. They should also be strong, so that the result aimed at may really be accomplished. It is for the board of health under the constitution and the statutes to determine what the regulations should be. In drawing up the rules it is very necessary to have them express exactly what is intended. There must be no ambiguity. The thing forbidden must be clearly defined and it must also be clear upon whom the penalty must fall. These regulations should be made so that warrants can be readily drawn and so that proof of violation shall be made as easy as possible for the prosecution. To improve the quality of local legislation, a number of state boards of health have prepared model rules for the guidance of the local boards within their jurisdictions. Such laws are usually prepared after a study of those which have been in successful operation, and as they are revised with care by the state board of health, are very suitable, with perhaps a few local modifications, for adoption by the majority of local health authorities in the state, and such rules are very often so adopted. Among the states which have prepared model ordinances may be mentioned: Connecticut, Illinois, Indiana, Iowa, Kansas, Maine, Michigan, New Jersey, North Carolina, New York, New Hamp-

[1] New Jersey, General Statutes, (1895), p. 1642, Sec. 40.

Michigan, Chapter 10 of 1895, Sec. 26.

[2] New York, Chapter 378 of 1897:

"Sec. 1182. The board of health may from time to time delegate any portion of its powers to the sanitary superintendent or an assistant sanitary superintendent, to be exercised by such delegate from the time and in manner, and to the extent specified in such delegation in writing."

shire, and Pennsylvania. Those of Maine are very brief indeed. On the other hand those of Iowa are very numerous and include matters covered by the statutes and by the regulations of the state board of health. The Pennsylvania rules also are very elaborate and would suffice for a great city. They deal very largely with the duties of the board of health and its employees. Among the best of these model codes is that of New York shown in Appendix 2.

STATUTES PROVIDING FOR THE ESTABLISHMENT OF SANITARY AUTHORITY, CONSULTED IN THE PREPARATION OF THIS CHAPTER.

ALABAMA. Code (1896), Secs. 2423–2437.
ARKANSAS. Cities of the first and second classes. Statutes (1894), Sec. 5203.
CALIFORNIA. Counties, Political Code (1886), Sec. 3059.
Municipalities, Political Code (1886), Sec. 3061–3.
COLORADO. Act of 17 April, 1893.
CONNECTICUT. Chapter 248 of 1893.
Chapter 144 of 1895.
DELAWARE. Counties, Revised Code (1893), Chapter 46.
Municipalities, Laws of Delaware, Vol. 16, Chapter 345.
FLORIDA. Revised Statutes (1892), Secs. 772–785.
Chapter 27 of 1897.
IDAHO. Revised Statutes (1887), Secs. 1150 *et seq.*
ILLINOIS. Municipalities, Annotated Statutes (1896), Chapter 24, Sec. 63, *seventy-five to eighty-four.*
Townships. Annotated Statutes (1896), Chapter 139, Sec. 128–130.
INDIANA. Counties and Municipalities, Act of 28 April, 1899.
Cities of the first class, Revised Statutes (1897), Secs. 4134, 4225.
Cities of the second class, Revised Statutes (1897), Secs 3984, 4072.
Cities of the third class, Revised Statutes (1897), Secs. 3959–60.
IOWA. Code (1897), Sec. 2568 *et seq.*
KANSAS. Counties, General Statutes (1897), Chapter 75, Sec. 11.
Cities of the first class, Statutes (1897), Chapter 32, Sec. 8.
Cities of the second class, Statutes (1897), Chapter 35, Sec. 95.
Cities of the third class, Statutes (1897), Chapter 38, Sec. 52.
KENTUCKY. Counties, Statutes (1894), Arts. 2047, 2055.
Municipalities, Statutes (1894), Arts. 2059.
Cities of the first class, Statutes (1894), Art. 2742.
Cities of the second class, Statutes (1894), Art. 3058.
Cities of the third class, Statutes (1894), Art. 3290.
Cities of the fourth class, Statutes (1894), Art. 3490.
LOUISIANA. Constitution (1898), Arts. 296-7.
Chapter 192 of 1898.
MAINE. Supplement Laws (1895), Chapter 14.
MARYLAND. Counties. Public General Laws (1888), Art. 43, Sec. 9.
MASSACHUSETTS. Townships, Public Statutes (1882), Chapter 80.
Municipalities, Chapter 332 of 1895.
MICHIGAN. Townships, Compiled Laws (1897), Sec. 2343.
Municipalities, Compiled Laws (1897), Sec. 4459.
Legislative power, Compiled Laws (1897) 4412.
MINNESOTA. Statutes (1894), Sec. 7048.
Cities, Statutes (1894), Sec. 1459.
Villages, Statutes (1894), Sec. 1224(23), 1299(30).

MISSISSIPPI. Chapter 15 of 1897.
Municipalities, Annotated Code (1892), Secs. 2281-98.
MISSOURI. Cities of the first class, Revised Statutes (1899), Sec. 5460 *et seq.*
Cities of the second class, Revised Statutes (1899), Sec. 5508.
Cities of the third class, Revised Statutes (1899), Sec. 5842.
MONTANA. Political Code (1895), Sec. 2860.
NEBRASKA. Metropolitan cities, Compiled Statutes (1899), Sec, 794.
Cities of the first class A, Compiled Statutes (1899), Sec. 1038.
Cities of the first class B, Compiled Statutes (1899), Sec. 1226.
Cities of the second class B, Compiled Statutes (1899), Sec. 1612.
NEW HAMPSHIRE. Public Statutes (1891), Chapter 108.
Cities, Public Statutes (1891), Chapter 50, Sec. 10.
Townships, Chapter 45 of 1897.
Townships, Chapter 65 of 1899.
NEW JERSEY. General Statutes (1895), p. 1636 *et seq.*
Cities of the first class, General Statutes (1895) pp. 1647–49.
Counties, General Statutes (1895), p. 1651.
NEW MEXICO. Cities, Compiled Laws (1897), Sec. 2446.
Towns, Compiled Laws (1897), Sec. 3706.
NEW YORK. Revised Statutes (1896), p. 2422, General Laws, Chapter 25, Art. 2.
NORTH CAROLINA. Act of 1 March, 1893.
NORTH DAKOTA. Counties, Revised Code (1899), Secs. 245–253.
Cities, Revised Code (1899), Secs. 254–274.
OHIO. Municipalities, Annotated Statutes (1900), Sec. 2113 *et seq.*
Townships, Annotated Statutes (1900), Sec. 2121.
Cities of the first class, 1st grade, Cincinnati, Sec. 2231.
Cities of the first class, 2d grade, Cleveland, Sec. 1545 (41, 45–7).
Cities of the first class, 3d grade, Toledo, Sec. 2141.
Cities of the second class, 1st grade, Columbus, Sec. 1545 (–95, –134 *et seq*).
Cities of the second class, 3d grade, *a* Springfield, Sec. 2113.
Cities of the second class, 3d grade, *b* Hamilton, Sec. 1545 (–290).
Cities of the second class, 3d grade, *c* Portsmouth, Sec. 1707 (–12).
PENNSYLVANIA. Cities of the first class, Brightly's Purdon's Digest (1894), p. 1428, Sec. 92; p. 1431, Secs. 115–59.
Cities of the first class, Two Acts of 22 May, 1899.
Cities of the second class, Act of 26 June, 1895.
Cities of the third class, Brightly's Purdon's Digest (1894), p. 1557, Secs. 129–137.
Boroughs, Brightly's Purdon's Digest (1894), p. 256, Secs. 240–7.
Townships, Act of 4 April, 1899.
RHODE ISLAND. General Laws (1896), Chapter 40, Secs. 13, 14 and 29.
General Laws (1896), Chapter 91, Secs. 20–22.
SOUTH CAROLINA. Act of 5 January, 1895.
Act of 19 February, 1898.
SOUTH DAKOTA. Act of 6 March, 1895.
TENNESSEE. Counties, Code (1896), Secs. 3106–14.
Municipalities, Code (1896), 3101–14.
TEXAS. Counties, Revised Statutes (1895), Secs. 418, 447–8.
Municipalities, Revised Statutes, (1895), Sec. 4322 *et seq.*
Towns, Chapter 169 of 1899.
UTAH. Chapter 45 of 1899.
Municipalities, Revised Statutes (1898), Secs. 1105, 1109.
Counties, Revised Statutes (1898), Secs. 1106, 1109.
VERMONT. Statutes (1894), Secs. 4675–80.
VIRGINIA. Act of 7 March, 1900.

WASHINGTON. Counties, Code and Statutes (1897), Sec. 2972.
Municipalities, Code and Statutes (1897), Sec. 1237.
Townships, Code and Statutes (1897), Sec. 629.
WISCONSIN. Municipalities, Statutes (1898), Secs. 925(-107 to 111 b).
Townships, villages and cities, Statutes (1898), Secs. 1411-12.
WEST VIRGINIA. Code (1899), Chapter 150.
WYOMING. Revised Statutes (1899), Sec. 2226 *et seq.*

CHARTERS AND SPECIAL ACTS FOR CITIES.

ATLANTA. Act of 26 February, 1877; 23 August, 1879; 8 December, 1880; 3 September, 1881.
AUGUSTA, GA. Act of 26 February, 1877; 7 May, 1877; 29 August, 1879; 8 December, 1880; 8 December, 1888.
BALTIMORE. Chapter 123 of 1898, Sec. 31.
BATON ROUGE AND SHREVEPORT. Act of 20 March, 1878.
BRIDGEPORT. Act of 22 March, 1877.
BROOKLYN. Chapter 307 of 1890.
BOSTON. Chapter 448 of 1854.
BUFFALO. Chapter 105 of 1891, Secs. 17, 231 *et seq.*
CHICAGO. Act of 13 February, 1863; 16 February, 1865; 9 March, 1867.
DENVER. Act of 11 April, 1891, Sec. 1.
DETROIT. Chapter 10 of 1895.
DISTRICT OF COLUMBIA. Act of Congress, 21 February, 1871; 11 June, 1878; 24 April, 1880.
HARTFORD. Act of 3 March, 1886, "validating" Ordinance of 26 January, 1885.
MANCHESTER, N. H. Chapter 165 of 1885.
MILWAUKEE. Chapter 184 of 1874, sub-chapter XIII. Chapter 36 of 1878.
MINNEAPOLIS. Chapter 413, Special Laws, 1889.
MEMPHIS. Chapter 11 of 1879.
NEWBURGH, N. Y. Chapter 270 of 1885.
NEW HAVEN. Chapter 418 of 1897.
NEW YORK (The City of). Chapter 378 of 1897.
PROVIDENCE. Chapter 598 of 1866, Sec. IX., Clause I.
READING. Act of 22 April, 1873.
RICHMOND. Chapter 101 of 1870, Sub-Chapter 3, XV-XIX.
SAN FRANCISCO. Concurrent Resolutions, Chapter II, 26 January, 1899.
SANTA BARBARA. Act of 20 February, 1899.
ST. PAUL. Charter of 1874, Chapter XI.
SACRAMENTO. Act of 27 March, 1868.
SCRANTON. Act of 23 May, 1874.
VALLEJO. Act of 26 January, 1899.
WILMINGTON, DEL. Laws of Delaware, Vol. 17, Chapter 207.

CHAPTER II.

REGISTRATION OF VITAL STATISTICS AND DISPOSAL OF THE DEAD.

THE registration of vital statistics is the firm basis on which the whole structure of sanitary science and practice must rest. In order to learn the laws of disease, to devise remedies, and test them, we must have an approximately accurate knowledge of the movement of population and of the causes of death. Not only is a knowledge of these required, but also an accurate census showing the distribution of the population as to age, sex, civil condition, race, etc. Correct knowledge of population and its movements is valuable, not alone to sanitary science, but to the economist, the educator, the penologist, and indeed to the student of every branch of social science. A subject which is of such vast scientific importance should receive most careful governmental attention, and every aid should be given in assisting its investigation. Unfortunately scientific considerations have little weight with politicians; but fortunately there are other reasons which render an accurate record of the movement of population desirable. The maintenance of property rights requires a correct record of family relations, and is only to be obtained by a public record of each birth, marriage, and death. The advantage of such a record was very early felt among the colonies and was manifested in appropriate legislation. In Virginia on 24 February, 1631,[1] it was enacted that ministers and church wardens should report births, marriages and deaths to the midsummer quarter court. The first registration law in Massachusetts was adopted in 1639,[2] and in Plymouth in 1646.[3]

The registration of vital statistics is interesting in connection with our subject because of its great value in aiding the progress of sanitary knowledge, and it must also receive our attention because it is often one of the functions of the sanitary department.

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[1] Hening's Statutes at Large, Vol. I., p. 155.

[2] Records of Massachusetts, Vol. I., p. 276.

[3] Plymouth Colony Records, Vol. I., p. 96 (3 March, 1645-6).

There are several reasons for this. The routine work of the health officer requires that he should have the earliest possible knowledge of recognized dangerous communicable diseases, and hence returns of death should properly be made directly to him. It is of great importance that a medical man should, if possible, see all returns of death, to scrutinize the causes, and usually some member of the board of health is the most available medical man for this purpose in the public employ. Sanitary officials are more likely than any others to make a good use of the data obtained, and to record and tabulate the returns properly. Sanitary officials are more likely than any others to secure complete and correct returns. Hence it is very generally the custom in cities, even of moderate size, for the board of health or health officer to be entrusted with the duty of collecting and recording the deaths in the population within its jurisdiction. In any community which is of sufficient size to have a permanent office or clerk for the sanitary department, there can be no doubt that this department should have charge of the registration of deaths. The records of births should be in the hands of such a department, because for other reasons it would be in touch with the physicians who are to make the returns, because it can check returns of births by returns of deaths of infants, and because it can more accurately separate still-births from deaths than could any non-medical recorder. The writer also believes that marriages ought to be recorded by the same authority, even though this might necessitate the issuing of licenses as well. The issuing of marriage licenses and the recording of marriages may not seem to be properly a sanitary function, but it can be best performed in conjunction with the recording of births and deaths. Marriage is as important as births and deaths in the movement of population, and under present social conditions all of our social problems require a knowledge of this factor. Births, marriages and deaths are best collected and recorded by the same officials, and the sanitary official in cities at least is the best fitted to have control of it. The experience of the New England townships, and many of our important cities, where the registration of all of these three classes of vital phenomena is done by the same officer, shows that fuller and better returns can be thus obtained. The registration of births, marriages and deaths is a desirable function to have performed by sanitary officials and is performed by them in many communities. It is therefore discussed in this chapter. The methods employed for obtaining the data necessary for making a full and complete record of births, marriages, and deaths vary greatly in different states and cities, and in the same state the records of each of these three classes, births, marriages and deaths, may be collected in different ways.

DEATHS.

Collection of Death Records.

Probably the most unsatisfactory method of obtaining death records is by an annual census. This enumeration method has been pursued in the United States censuses, and, as is well known, the results have been very unsatisfactory. This must necessarily be the case, for the memory of people is not to be trusted even in such important matters. Moreover, even the most skilled enumerators are not able by questioning to overcome the stupidity or carelessness of many of the persons questioned, and skilled enumerators are hard to find. Then, too, unless the census is taken on a single day, many persons will, by removal, entirely escape the enumerators.

This census method is provided for in Iowa, Kansas, Ohio, Pennsylvania, and Vermont, except in certain municipalities. In Ohio the assessors of each township and ward collect the data required by statute covering all births and deaths that have occurred, and make a return of the same to the probate judge of the county, and the assessor is to state upon oath that "he has made diligent enquiry" to obtain these facts, and he is not to be paid until his work is done to the satisfaction of the probate judge. Provision is by statute made for other methods in cities of over 150,000 inhabitants, and all municipalities are, through their board of health, to have power to register births, marriages, and deaths, and are required to register births and deaths, and all this registration work is under the supervision of the state board of health.

In Kansas the assessors collect the data for recording births, marriages and deaths annually, and physicians are obliged to keep a register of deaths and report them to the local board of health when required by the state board of health. In Pennsylvania the assessors are to make the enumeration semi-annually, "and it shall be the duty of parents, guardians and other persons to furnish to such assessors the information necessary." The assessors make semi-annual returns to the orphans' court and make oath as to their correctness. In Vermont the clerk of the board of school directors and the clerks of incorporated school districts are to take a census of births, marriages and deaths, and to report to the town clerk by February first, each year. They are to receive fifteen cents for each birth and death return, to be paid by the town. In Iowa the assessor makes an annual enumeration of births and deaths.

Another and more satisfactory method is to require certain persons, such as physicians, heads of families, or undertakers, to make returns of deaths, either directly or indirectly, to the officer who is to record

them. In most states[1] physicians are required to certify to deaths. In some states the terms doctor or surgeon are used. In Colorado it is provided that "when two or more surgeons, physicians or midwives may have attended professionally at any birth or death, that surgeon, physician or midwife who is oldest in attendance shall make the registry." In California and Kentucky, if two doctors attend, the eldest of the two shall sign. Usually it is "every physician who shall have attended a person in his last sickness" who shall give a certificate. In Minneapolis[2] it is "every physician who shall be in professional attendance upon any person at the time or within twelve hours of the time of death." In Rochester,[3] in order that none but a person having knowledge of the case shall sign a certificate, it is provided that

"No physician shall issue any certificate of death under the ordinance of this Board or the laws of this State, unless he was the medical attendant on the person named in said certificate during his or her last illness, provided said person died from natural causes."

In California "clergymen who officiate at a funeral" are obliged to report the same. In most of the states mentioned coroners as well as physicians are obliged to make returns, and in those states which have medical examiners, as Massachusetts, Connecticut, and Rhode Island, these officers also are obliged to make special reports of all deaths which they investigate. In California, Delaware, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, and Rhode Island undertakers are made responsible for all deaths coming under their charge; also in a number of cities outside of these states.[4] In California sextons as well as undertakers are to make returns of deaths, and in many cities in other states this is found as a municipal requirement. The form of undertaker's return used in Milwaukee is shown in Appendix 3.

Other persons than those above mentioned are sometimes required to make reports of deaths. Thus in Alabama it is any "other person having at the time of death charge of a sick person," and in New York City it is the duty of "each person being with such deceased person at his or her death, and of the persons occupying or living in any house or premises in or on which any person may die." The family is required

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[1] Alabama, California, Colorado, Connecticut, Delaware, Florida, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Dakota, Ohio, Rhode Island, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

[2] Minneapolis, Rules and Regulations, Department of Health (1889), Sec. 23.

[3] Rochester, Ordinances, Board of Health, number 6, Sec. 2.

[4] Allegheny, Charleston, Cincinnati, Cleveland, District of Columbia, Denver, Minneapolis, Mobile, Philadelphia, Pittsburg, Reading, St. Louis, Scranton.

to make a report of a death in Connecticut, Delaware, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, North Dakota, Vermont, Washington, and West Virginia, and in Pennsylvania the family is to give information to the assessors. In Massachusetts "every householder — the eldest next of kin — the keeper of a workhouse, house of correction, prison, hospital or almshouse — and the master or other commanding officer of a ship" shall give notice of deaths among persons under his charge. The law has been adopted in much the same form by several other states. In New Orleans[1] if there is no relative in the parish the report of a death is to be made by the executor if designated or by the landlord.

A number of states, as California, Maine, Maryland, Massachusetts, and Rhode Island, require reports from the different classes of persons mentioned above, independent of one another, so that in case of failure each is equally liable. In other states, as Connecticut, Illinois, Indiana, Missouri, Vermont, Washington, and West Virginia, the physician is required to report deaths, and the next of kin or householder only when there is no physician in attendance. In many states it is intended and is provided by statute, that the physician and undertaker and sometimes the family also shall act together, and this is doubtless the practice in certain places where it is not prescribed. Thus in Maine and New York the undertaker is to obtain from the physician the certificate of death and present it to the local board of health. In Delaware, Massachusetts, New Hampshire, New Jersey, Rhode Island, Vermont, and Wisconsin, and in certain cities, as Atlanta and Cleveland, it is the duty of the physician in attendance at the last sickness to furnish the certificate of death to the undertaker, but in Massachusetts and Wisconsin he is to do so when requested. Nevertheless in practice in Rhode Island the undertaker obtains it from the physician. The best provision is that of the Michigan[2] law:

"Whenever any person shall die, the undertaker, householder, relative, friend manager of institution, sexton or other person superintending the burial of said deceased person shall cause a certificate of death to be filled out with all of the personal and family particulars required in section three of this act, and attested by the signature of a relative or some competent person acquainted with the facts. The physician who attended the deceased person during his last illness shall fill out the medical certificate of cause of death."

In Denver and St. Louis the physician is to furnish two certificates, one to the undertaker and one to the commissioner of health. The blanks for both of these are furnished attached to one stub. In Omaha

[1] New Orleans, Act number 80, approved 20 April, 1877, Sec. 10.

[2] Michigan, Compiled Laws (1897), Sec. 4615.

the physician reports upon a postal card directly to the board of health the facts as shown below[1] and the undertaker obtains the rest of the items before a permit is given.

In order to insure that physicians shall report all the deaths which occur in their practice, it is advisable that they keep a current record of the same. A number of states and cities require this. Thus in the City of New York[2]

"Every physician and professional adviser who has attended any person during a last illness or has been present by request at the death of any person, shall make and preserve a registry of such death, stating the cause thereof, and specifying the date, hour, place, and street number of the place of such death."

This rule has been copied in Chicago, Omaha, and other cities. Even where it is not the law it is sometimes the custom, as when blank certificates in book form with stubs are furnished to the physicians by the state or city.

The interval of time after a death during which the return must be made is important. It is necessary that births, marriages and deaths should be reported promptly, otherwise they are forgotten and fail of record altogether. In those states and cities in which a permit is required before burial or removal, it is scarcely necessary to fix this limit. A very short limit is sometimes set for reporting deaths from certain contagious diseases. Thus in Philadelphia physicians are obliged to sign certificates of death from contagious diseases in twenty-four hours, all others in forty-eight hours.[3] In Maine[4] the certificate shall be made and forwarded immediately. Such a regulation is hardly

[1] [Physicians are subject to prosecution and fine for failure to return Certificate of Death to Commissioners of Health within 24 hours.]

CERTIFICATE OF DEATH — OMAHA, NEB.

Name ..... Sex .....

Married, Single or Widowed [Mark out all but one.] Age ..... Yrs. ..... Mo. ..... D.

Residence No. ..... Street .....

Date of Death ..... Duration of last illness .....

Cause of Death — primary .....

" " " — secondary .....

When no Doctor, to be signed by Coroner. ..... M. D.

Undertaker .....

[2] City of New York, Sanitary Code (1899), Sec. 179.

[3] Philadelphia, Rules of Board of Health (1895), Sec. 205.

[4] Maine, Chapter 118 of 1891, amended by Chapter 154 of 1895, Sec. 4.

necesssary now that reports of cases of contagious disease are required, and the local board of health is thus supposed to have a knowledge of all cases, alive or dead. The limit for reporting deaths from other diseases varies very much. In Illinois, Missouri, Washington, West Virginia, and in certain cities, as Camden and Newark, N. J., reports of deaths are to be made within thirty days. In Ohio cities physicians are to send in their returns by the second Monday of each month, and in Denver by the fifth day of each month. In Minnesota deaths are to be reported within ten days. In New York City the family and friends are liable to a fine if death is not reported in five days. In North Dakota the time is five days. In Denver coroners must make their reports in three days. In Charleston the doctor must report in three days. In Philadelphia and Rhode Island physicians must sign the certificates of death in forty-eight hours, and in Yonkers coroners must report within the same time. In Vermont and in Brooklyn, Chicago, Erie, Milwaukee, Memphis, Omaha, and Rochester, deaths must be reported in thirty-six hours. In Buffalo, Detroit, the District of Columbia, Florence, S. C., Newburg, N. Y., Omaha, and Reading, the returns of deaths must be made within twenty-four hours. In Portland, Ore., the time is twelve hours. In Scranton and Albany the certificate of death must be presented to the board of health twenty-four hours before burial. In New York City coroners are obliged to report to the board of health as soon as they are called to a death. In Milwaukee where the physician is to report direct to the health department and not through the undertaker, stamped envelopes are furnished on application, and in Omaha postal cards.

The best method that can be devised to secure prompt and certain returns of deaths is to require a permit from the board of health or some official before burial or removal can take place. Burial and transit permits are the first requisite of correct death registration, at least under such conditions as exist in the United States. They are required by statute in fifteen states,[1] and in many cities outside of these states.[2] In California, Massachusetts, Michigan, New York, in New Hampshire cities, and in Wisconsin, and in most cities having local rules of their own, the certificate of death is to be presented, and the permit obtained

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[1] California, Connecticut, Delaware, Florida, Indiana, Maine, Massachusets, Michigan, Ohio, New Hampshire, New Jersey, except in unincorporated districts, New York, Utah, Vermont, and Wisconsin,

[2] Atlanta, Baltimore, Denver, District of Columbia, Charleston, Chicago, Cincinnati, Cleveland, Erie, Florence, S. C., Minneapolis, Mobile, New Orleans, Omaha, Pennsylvania cities of the second class, Philadelphia, Providence, Reading, Scranton and St. Louis.

from the local sanitary authorities when such have been established; but in Connecticut, Maine, New Hampshire and New Jersey the permit for burial is to be issued by the town clerk or city clerk, and in Vermont by the town clerk, except in cases of communicable diseases. In California, if there is no board of health, the permit is issued by a justice of the peace. In Cleveland the permit is to be obtained from the health officer or from a police station. In New Jersey[1] when it is impossible to obtain a permit from the town clerk it may be obtained from a judge or justice.

In Delaware a permit is not required, but undertakers are forbidden to inter until a certificate has been obtained from the physician. There seems to be no valid reason why permits should not be required in all cities, and the only objection to this requirement elsewhere — the difficulty of obtaining a permit in sparsely settled regions — may be met as in Connecticut, Maine and New Hampshire, by the appointment of sub-registrars to issue permits. The Maine law is given below.[2]

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[1] New Jersey, General Statutes (1895), p. 2008, Sec. 6:

"That in case where, on account of the absence of the registrar of vital statistics or the clerk of any city, borough, town or local municipal government, or for any other sufficient reason, it may be impossible to obtain from such registrar or clerk a permit in time for burial, it shall be lawful for any judge of the court of common pleas or any justice of the peace of the county in which the death occurred, on presentation of the certificate of death to him, and being satisfied that such certificate is genuine, and that no permit can be obtained in time for burial from the clerk aforesaid, to issue a special permit for burial in the following form: 'It being impossible to obtain a burial permit from the registrar of vital statistics or the clerk of the [stating here the name of the city, borough, town or other local municipal government], on account of [state here the reason], I, a judge of the court of common pleas [or a justice of the peace], of the county of , do hereby grant this special permit for the burial of , whose death has been duly certified to me,' which permit shall be dated and signed by such judge or justice; the said judge or justice shall transcribe a copy of said permit upon the back of the certificate of death, shall give the original permit to the person delivering to him the certificate of death, and shall transmit the certificate with the transcription theron indorsed, by mail, in an envelope marked "burial permit," to the state bureau of vital statistics, at Trenton; the judge or justice who shall issue any such permit shall be entitled to charge and receive from the person presenting to him such certificate of death the sum of fifteen cents."

[2] Maine, Chapter 118 of 1891, as amended by Chapter 154 of 1895:

"SECTION 8. The town or city clerk shall appoint two suitable and proper persons, in each town or city, as sub-registrars, who shall be authorized to issue burial permits based upon a death certificate, as hereinbefore provided, in the same manner as is required of the town or city clerk; and the said record of death upon which the permit is issued shall be forwarded to the town clerk within six days after receiving the same, and all permits by whomsoever issued shall be returned to the town clerk as required by section seven of this act. The appointment of sub-registrars shall be made with reference to locality, so as to best suit the convenience of

To provide for unincorporated regions it was enacted in Maine that the death, marriage or birth should be reported to the nearest town clerk and recorded by him.[1] In Michigan permits are not required in sparsely settled townships having an average density of population of less than five (5) persons per square mile at the time of the last preceding United States or State Census; but when that density of population is reached, the law is to go into effect. In New Jersey for the convenience of undertakers it is provided that when a burial is to be in a place other than the township where the death took place the undertaker may present the certificate of death in the town of burial or in his own town, and there receive the permit, but he must deposit with the certificate two cents for postage, and the registrar must send the certificate by mail to the township where the death occurred.

Trouble has arisen in Pennsylvania where a cemetery lies in two municipalities, so that a statute was necessary which declared that a burial permit issued by either is valid.

As an example of statutory provisions requiring burial permits, the following from the Michigan[2] law may be cited:

"The body of no person whose death occurs in the state shall be interred, deposited in a vault or tomb or otherwise, or removed from the township, village or city in which the death occurred, until a permit for burial or removal shall have been properly issued by the clerk of the township, village or city in which the death occurs."

Various forms of burial permits are used. A very simple form has been used in Providence for over forty years and has been entirely satisfactory. Indeed, if the permit is merely to be kept by the undertaker, or presented at a local cemetery, a simpler form giving merely the date of issuing the permit, date of death, name of deceased, place of burial, and undertaker's name might do just as well. If it is desired to keep a record of permits issued, as is the custom in many places, the permits may be attached to a stub and bound in book form as in Michigan. If it is required that the undertaker leave the permit with the keeper of the cemetery, it is well to have a voucher attached for the undertaker to keep, as in the form recommended in Maine. The rules

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the inhabitants of the town, and such appointment shall be in writing and recorded in the office of the town or city clerk.

"SECTION 9. Town clerks and sub-registrars may issue burial permits to persons in contiguous towns, when by so doing it would be more convenient for those seeking a permit, but in all cases the permit shall be made returnable to the town clerk of the town in which the death occurred."

[1] Maine, Chapter 118 of 1891, as amended by Chapter 154 of 1895, Sec. 20.

[2] Michigan, Compiled Laws (1897), Sec. 4614.

recommended by the American Association of General Baggage Agents and adopted by a large number of states, require that every body shipped by a common carrier shall be accompanied by a transit permit and "the transit permit must be made in duplicate with the signatures of all attesting parties. The duplicate copies shall be sent to the secretary of state or provincial board of health of the state or province from which the shipment was made.

When dead bodies are shipped by express the whole original transit permit shall be pasted upon the outside box, and the duplicate forwarded by the express agent to the secretary of the state or provincial board of health of the state or province from which such shipment was made."

Examples of different forms of permit are shown in Appendices 4 to 7. In Denver and St. Louis two certificates are furnished by the physician, one of which is taken by the undertaker to the health department and endorsed on the back. It then serves as a permit and is left at the cemetery.

The object of requiring permits before burial is to secure the reporting of all deaths that occur, and therefore failure to obtain such a permit is punished by fine. In addition to such requirement and its penalty, a second safeguard is sometimes made use of. Not only is the undertaker required to obtain a permit before the burial of the body, but he is obliged to deliver it, together with the body, to the keeper of the cemetery, who in turn is required to return it to the officer by whom it was originally issued. By this means the chance of a death occurring without a record of the same is very much lessened.

To secure the greatest value from such a regulation it should be part of the statute law as it is in Maine. If it is merely a local regulation no control is had of burials in out of town cemeteries, and especially when the body is removed by out of town undertakers, as may easily be done without the knowledge of the local registrar. Local regulations of this kind are found in Charleston, Cleveland, District of Columbia, Memphis, Minneapolis, Newburgh, New York, Omaha, Philadelphia, St. Louis, Scranton, and Yonkers. In Buffalo the sextons are to send in the permits annually; in Newburgh every three months; in Yonkers on the first of every month; in Omaha within five days; but in most cities they are returned weekly. In Maine the permits are to be returned to the clerk of the town within six days after the day of burial.

In Cambridge, Mass., permits are to be returned if not used.

In certain other cities, as Atlanta, Augusta, Lowell, Milwaukee, and New Orleans, sextons are required to keep a complete record of all

burials, and in some cities to report them to the health department. The form used for this in Milwaukee is given below.[1]

Sometimes a permit is required when a body is to pass through a city as in Cleveland, the District of Columbia, Minneapolis, Newark, and New York. Occasionally, as in St. Louis, it is specified that it shall not be required.

Whenever a body is brought into a township for burial it is advisable that that fact should be recorded. Permits for burial are in such cases required in many cities, as Atlanta, Buffalo, Cambridge, Mobile, Newark, Paterson, Philadelphia, Reading, St. Louis, Wilmington, Del., and Yonkers. In Philadelphia the transit permit in such cases must also have the local undertaker's certificate which must state the place from which the burial is to take place. If an out of town body in St. Louis is not accompanied by a certificate of death, it must be referred to the coroner. In Wilmington, Del., a body dead of contagious disease cannot be brought into the city for six months after death. In New Jersey[2] it is provided that when a body is brought into the state for burial it must be accompanied by a certificate of death, or else one must be obtained from some physician in the town or city where the burial is to take place, and a permit for burial must then be obtained. In Connecticut[3] the permit in such cases must be obtained of the registrar of the town where the burial is to take place. The Maine law is very similar. In Providence permits for burial of bodies brought to the city are not required, but undertakers must in all cases return certificates of death within ten days after the body has been brought into the city.

In California, Delaware, and New York, undertakers are forbidden to bury a body until a permit is obtained, and if this is strictly enforced it

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[1] Milwaukee, Wis., ... 189.....

To.....

Registrar of Vital Statistics.

Sir: Following is a list of burial permits received at the ..... Cemetery for the month of..... 189.....

.....

Secretary.

Permit No.	NAME.	Date of Burial.	Permit No.	NAME.	Date of Burial.

[2] New Jersey, General Statutes (1895), p. 2008, Sec. 7.

[3] Connecticut, Chapter 155 of 1893, Sec. 3.

would apply to bodies brought into the town for burial as well as those of persons who died there.

The laws which require permits generally specify that no body shall be "buried, removed from the city or otherwise disposed of" without the permit, and in the California law is added the word cremated. In Wisconsin no undertaker is to prepare a body for incineration without a permit.

For legal, genealogical and other purposes, it is very desirable that the deaths, births, and marriages of members of resident families should be recorded in the place of residence, even if the birth, marriage, or death takes place elsewhere. In the case of deaths, if the body is returned to the place of residence for burial, as frequently happens, and if such burials are reported, the facts may go on record. The Maine, Massachusetts, New Hampshire, and Rhode Island laws contemplate the record of the births, marriages, and deaths in the place of residence, and the provisions in Rhode Island are given below.[1]

If a similar law should be adopted in all states, records of this kind could be made very complete. It is sometimes objected that in regard to births and marriages it is an unwise provision. It is said that a certainty of the publicity of a marriage or birth at home will often deter a man from marrying the woman with whom he has had improper relations, while if secrecy for the time could be secured he would be ready to enter into marriage. Whether such a view of the law is warranted it is perhaps not easy to determine.

Items required on Death Returns.

The information concerning deaths required for record varies very much in different cities and states. There has been a progressive increase in the number of facts to be recorded. In the earliest colonial

[1] Rhode Island, General Laws, Chapter 100, Sec. 17, as amended by Chapter 1262 of the Public Laws:

"The clerk or registrar of each town and city shall on the first day of each and every month make a certified copy of all births, marriages, and deaths recorded in the books of said town or city during the previous month, whenever the parents of the child born, or the bride or the groom, or the deceased person, were resident in any other town or city in this state or in any other state at the time of said birth, marriage or death; and shall transmit such certified copies to the clerk or registrar of the town, city or state in which such parents of the child born, the bride or the groom, or the deceased, were resident at the time of said birth, marriage, or death, stating in case of a birth, the name of the street and number of the house, if any, where such parents resided, the place of birth of such parents and the maiden name of the mother, whenever the same can be ascertained; and the clerk or registrar so receiving such certified copies shall record the same in the books kept for recording births, marriages, and deaths. Such certified copies shall be made upon blanks to be furnished for that purpose by the secretary of the state board of health."

records it was customary to record in most cases merely the name and date of death, though the age or parents' or husband's name was sometimes given. It is only during the present century that additions have been made to those simple records. About the beginning of the century the cause of death began to be recorded in Boston and Philadelphia, but it was not for many years and until after the development of interest in public sanitation, that this became general. With the increase of population better means of identification were needed and age, names of parents, etc., came to be added. With the great interest which has been aroused during the last half of the century in sanitation, in social science, and in statistics, a large number of items have been considered desirable in death returns. Undoubtedly the more facts that can be recorded accurately, the better will it be for the progress of science; but there must be a limit. If too many data are required, or data which it is not easy for the reporter to ascertain, carefully made returns cannot be expected, and inaccuracies will result which will be anything but helpful to science.

Much care should be used in devising a schedule of items for death returns, and probably the value of any form can be fully tested only by experience. It seems to the writer that in order to satisfy sanitary and social requirements a return of death should contain

Name,
Date of death,
Place of death,
Usual residence,
Age,
Sex,
Color or race,
Civil condition,
Husband's name, if wife or widow,
Occupation,
Place of burial,
Cause of death.

These should be certified to by the physician and undertaker if such were in attendance. The above are essential and are required wherever registration is at all satisfactory. Other items which are often required and are very useful are

Birthplace,
Names of parents,
Birthplaces of parents,
Duration of disease.

Some of the above items require explanation.

Place of death.

The Massachusetts, Michigan, Pennsylvania and other laws specify that if in a city, the ward, street, and number of the house must be given. In Charleston if the death occurs in an institution the name of the institution must be given. In Buffalo and Brooklyn the floor of the house must be given and the number of families in the house. In Connecticut the number of families must be given in the usual residence, if the deceased resided in a tenement house.

Age.

In Massachusetts one of the requirements of the death certificate is "the supposed age," presumably to indicate that if the exact age is not known the approximate age should be given. In Wisconsin and Michigan it is specified that the age shall be given in years, months and days. In New Jersey and Buffalo a blank for hours is left. The Wisconsin law and the blanks used in Rhode Island require the date of birth of the deceased, and it would appear that fewer errors would occur if this were given. Relatives remember the date of birth, not the age in years, months and days, and for them or the undertaker to calculate the latter is not a particularly easy arithmetical problem.

Color.

The color distinctions usually made are White and Colored, though distinctions in the latter as Mulatto and Quadroon are sometimes asked for. This distinction of Black and Mulatto would be very valuable if it could be obtained, but attempts to obtain it do not seem to be successful. Indian and Chinese are racial distinctions, but are sometimes noted under this heading. In California and Milwaukee race is to be specified, the intention doubtless being to require a distinction to be made between Caucasian so-called, Indian and Chinese. Probably it would be best to have one item, Race or Color, and the individual would then be designated as White, Colored, Indian, or Mongolian, which would meet all conditions now commonly existing in the United States.

Occupation.

In Wisconsin it is to be reported "whether the deceased was ever a soldier or sailor in the service of the United States."

Place of Burial.

The Michigan law requires "the proposed place of burial or place and route of removal."

Cause of Death.

Most forms for returns of death ask for Cause of death? Primary? Secondary? and sometimes a line is given for complications. The

writer has found that much confusion exists in the minds of physicians as to whether Primary? refers to time or to the importance of the diseased condition. Furthermore many feel obliged to write in two causes instead of one in every case. It has been found possible to obtain a better picture of disease conditions by dropping the words primary and secondary, and adding several blank lines to encourage a detailed account of the case. This appears to be quite important. It is utterly impossible in many cases to give a correct explanation of a death in a single line, and the attempt to do so is quite likely to be misleading. If the physician can be induced to tell the story at some length, greater accuracy is more likely to be obtained. The Massachusetts law only requires the primary and secondary causes if "the deceased was a soldier or sailor who served in the War of the Rebellion."

Accuracy in stating the cause or causes of death is of the utmost importance and every registrar knows that a considerable proportion of the returns coming to him are valueless in this respect. How to get better results is one of the most important problems in registration. Intelligence and education on the part of the medical attendant is the chief factor in correct diagnosis, and whatever tends to raise the standard of the profession in these respects makes for more perfect registration. Progress must be slow, but the adoption of the practice of licensing physicians, and establishing a high educational qualification, will do much for registration, as it will also for sanitation proper. With the licensing of a physician must go a rule forbidding all but licensed medical men signing a death return. Such a rule is now in force in a few cities as the District of Columbia, Charleston, Rochester, and St. Louis. Even the best educated physician at times cannot arrive at the true cause of death without an autopsy. We cannot expect to see the power to make autopsies conferred by law, but it is easily observed that the higher the education and abilities of the physician the more often are autopsies performed. The higher the intelligence the more sensibly are the limitations of diagnosis perceived, and the more urgently and successfully are post mortem examinations sought. In Denver[1] the health commissioner is authorized to order an autopsy in obscure cases.

[1] Denver Ordinances, No. 44 of 1893, Sec. 152:

"Whenever, in the opinion of the health commissioner the cause of death of any person as given in the certificate of the physician, coroner or other professional attendant of the deceased person is incorrect, obscure or false, and it is in the health commissioner's judgment in the interest of the public health that such cause of death shall more accurately, truthfully and correctly be ascertained, it shall be the duty of the health commissioner to make, or cause to be made, a post mortem examination of the body of such deceased person, and to this end he is hereby empowered to enter upon any premises in order to discover and properly examine such dead body, or to cause such dead body to be disinterred, if it has been already buried."

It is not, however, likely that in American communities, public opinion would permit of such a procedure other than in very exceptional cases.

One of the most effectual methods of improving the character of physicians' returns of the cause of death is by letters of inquiry sent out by the registrar who receives the returns. Busy practitioners are often careless in filling out returns, and frequently they do not appreciate the importance of certain points which are of the greatest value in compiling statistics. Mistakes and ommissions in returns of death can be largely overcome by correspondence between the registrar and the physicians. In Providence a blank form is used for convenience in sending out these inquiries, a stamped return envelope is enclosed, and it is seldom that such a communication fails to elicit a courteous and satisfactory response. The following by-laws are enforced by the board of health of the City of New York:

"Certificates of death *will be returned for additional information*, which give any of the following diseases, without explanation, as the sole cause of death:

Abortion,	Erysipelas,	Meningitis,	Phlebitis,
Cellulitis,	Gangrene,	Metritis,	Pyæmia,
Childbirth,	Gastritis,	Miscarriage,	Septicæmia,
Convulsions,	Hemorrhage,	Peritonitis,	Tetanus.

(Any one of these may be the result of an injury, and thus be a subject for investigation by a coroner. If it is not, the certificate should make that fact plain.)

No certificate will be accepted which gives a mere symptom as the sole cause of death (such as 'asphyxia,' 'debility,' 'dropsy,' 'heart failure,' etc.), unless accompanied by a satisfactory written explanation."

To prevent a common form of unsatisfactory and careless return it is provided in Maine and Connecticut by statute, and in Philadelphia by regulation, that death certificates with "heart failure" as a cause of death will not be received; and in Wisconsin and Iowa this cause will not be received on a transportation permit. In the latter state the reason is given that it was used by unscrupulous persons to conceal death from contagious disease.[1]

Another difficulty in the way of obtaining a satisfactory registration of causes is the fact that a certain number of deaths occur without the attendance of a medical man. It is necessary that all such should be investigated by some competent person. Of course if violence is suspected, it is a proper case for the medical examiner or coroner whose report will be returned in due season, as is provided for by the laws governing such cases; but often persons die suddenly when there is no suspicion of violence, and it is these that need special investigation. In Alabama the county health officer is to "make such certificate, if

[1] Iowa, Report of the State Board of Health 1891, p. 194.

otherwise a proper certificate cannot be obtained." In Connecticut,[1] "in case no physician attended such deceased person, or in case of the inability of the attending physician, by reason of sickness, death, or absence, to make out said certificate, the nearest of kin shall procure such certificate from some other reputable physician or member of the board of health of the town in which such person died."

In California and Utah when there is no physician, the cause of death must be sworn to by two reputable citizens (except that in Utah cities the case is to be investigated by the health officer) and in New York in non-medico-legal cases, it must be "sworn to by some credible person known to the officer granting the permit." In Atlanta and Buffalo the city physician is to certify to all deaths without a medical attendant, and in Cleveland it is a similar officer known as the district physician. In New York when no physician is in attendance, an affidavit must be attached to the certificate stating the circumstances of death. In Massachusetts the chairman of the board of health or any physician employed by any city or town for that purpose shall sign the certificate. In Michigan the registrar is to refer such returns to the health officer, except that when the health officer is not a physician the registrar is to fill the return to the best of his ability. In New Hampshire the town clerk is to get the facts from relatives. In Wisconsin any physician or justice of the peace may be employed to sign the return where there has been no physician in attendance. In New Jersey if no physician attended such deceased person, or if the attending physician is absent or sick any physician may view the body and sign the certificate. The best provision appears to be that of the Rhode Island law:[2]

"Whenever the body of a person is lying dead in any town or city who has been unattended by a physician in his or her last sickness, the town or city clerk, or in the city of Providence the city registrar, shall call upon a registered physician or the medical examiner of the district in which the remains are lying, to inquire into and to certify as to the cause and manner of death, and shall allow to said physician or medical examiner the fee of two dollars which shall be paid out of the town or city treasury of said town or city upon the order of said town or city clerk or registrar."

In Providence the registrar has under this law requested the chief of police to instruct his officers to promptly report all sudden deaths or deaths without medical attendance to the medical examiner. If the latter decides that there is a suspicion of violence he makes it a medical examiner's case and receives his fee, four dollars from the state. If it

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[1] Connecticut, Chapter 155 of 1893, Sec. 1.

[2] Rhode Island, Chapter 452 of the Public Laws, amending Sec. 9 of Chapter 100 of the General Laws.

is not a medical examiner's case he reports the probable cause of death to the registrar and receives two dollars from the city. By this method satisfactory returns are promptly obtained. If cases without suspicion of violence are reported to the registrar by undertakers or any others than the police, the registrar sends the medical inspector of the department to investigate the case.

Undertaker's Name and Address.

Wherever the undertaker is wholly or partially responsible for returns of death he is required to sign the same, and sometimes as in Michigan his address is to be given. In Massachussetts, New Jersey, Denver, the City of New York, and Pennsylvania cities of the second class, the place of business of the undertaker is to be given and in Cleveland his office or residence.

Physician's Name and Address.

Usually it is deemed sufficient for the physician to certify as to the cause of death, but sometimes as in Michigan, Massachusetts, New Jersey, New York, Buffalo, Detroit, Denver, and Pennsylvania cities of the second class his address is to be given.

Birthplace.

The Pennsylvania law requires the "street and number if possible," and the Michigan law the "state or county if not born in Michigan." It is often impossible to determine the exact place of birth, but it is usually possible to ascertain whether or not it was in the United States. As this is of great importance for statistical purposes it is necessary for the registrars to instruct undertakers and other reporters concerning it. Sometimes nativity is required instead of birthplace, in which case the country of birth or nationality is intended.

Names of Parents.

In Pennsylvania this is only required in case of minors, and in Charleston in the case of unnamed infants. By name of mother is usually meant and often specified the maiden name.

Birthplaces of Parents.

It is highly desirable that these should be given if possible, and they are asked for on the returns of Maine, Massachusetts, Michigan, New Hampshire, and Rhode Island. In Delaware the "name and nation of the parents" is asked for. Here again the distinction between the United States and foreign countries can usually be made even when more accurate data are lacking, and should always be insisted on. It is probably this distinction of native and foreign that is intended where merely nativity of parents is asked for as in the Pennsylvania certificate; but full information should be given if it can be obtained.

Duration of the Disease.

Usually the duration of both primary and secondary causes of death is asked for, and in Providence this distinction is retained under duration although it is omitted from cause.

Other items are occasionally noted on death returns.

The Date when Physician last saw Patient.

This is required in Charleston, where the physician is to subscribe to the following: "I hereby certify that I attended deceased from .....18.....to 18..... that I last saw..... alive on the..... day of.....18....."

A similar form is used in Michigan, New Jersey, and New York.

Place where Disease was Contracted.

Among the items required by the Colorado law are "when and where the disease was contracted," and the same phrase with the proviso, "if known," is found in the rules of the Omaha department of health and upon the certificate in Mobile.

Term of Residence.

In Buffalo, Charleston, the District of Columbia, Minneapolis, and Pennsylvania cities of the second class, the time of residence in the place of decease is to be given. In Buffalo, Charleston, and the City of New York, if the deceased was of foreign birth, the duration of residence in the United States as well as in the city must be given. In Minneapolis, New Jersey, and Iowa, the time of residence in the state is asked for.

Place of Previous Residence.

In Pennsylvania cities of the second class, the place of previous residence is required, and also in Cincinnati, but only "in case of non-residents"; this is practically the same as "usual residence." So also in Charleston the returns from institutions must give the residence before admission.

Date of Burial.

This is required in Maine, New Hampshire, Pennsylvania, Cleveland; and in Buffalo, Cincinnati, and Detroit, the day and hour of the funeral.

Name of Wife.

In the case of married women and widows the name of the husband is usually required. In the case of a married man the name of the wife is required in Rhode Island, Virginia, Wisconsin, and Detroit.

Age at First Marriage.

This is one of the questions to be answered on returns of death in Michigan.

Parent of how many Children, of whom how many are living.

It is evident that if these questions could be truthfully answered we could speedily reach conclusions as to the absolute fertility of our population, and the relative fertility of different classes. We have as yet nowhere in the United States been able to settle these questions by an enumeration or registration of births. The results of the experiments in Michigan will be awaited with much interest. Their value must depend entirely upon the degree of accuracy with which the answers to these queries can be obtained.

The number and date of the burial permit must be noted on the death return in Wisconsin. The Michigan law requires that the return be numbered, and the blanks furnished in New York, have a place for a serial number. The Minnesota blanks have a place for date of return. In Connecticut the date when the certificate is received is endorsed on the back, and in Massachusetts the date of filing is noted on the back.

Name of Informant.

The personal and family particulars required for a return of a death must usually be furnished by some one other than the undertaker or the physician. The Michigan law prescribes that the person who gives the information shall sign the return and append his address. In Rhode Island the name of the informant is required (but not the signature), and in New Orleans the "name, age and residence of the declarant and his relationship, if any, to the deceased." It is of great convenience to the recording officer and conduces to accuracy if the items on the return are arranged as nearly as possible in the same order that they are on the permanent record if such record is to be made. Forms of death returns are shown in Appendices 8 to 12.

Births.

Records of births like records of deaths are obtained in various ways. One method is by enumeration. This method is very unsatisfactory, but is employed in Michigan, Ohio (except in cities of the first class), and Pennsylvania, and Iowa in 1898 went back to this method. Until 1896 it was the only method in Rhode Island. Besides the above states, Kansas, Maine, Massachusetts, New Jersey and Rhode Island supplement the reports of physicians by an annual enumeration. In Michigan the township supervisors between 10 April and 1 June of each year make an enumeration of all births occurring during the year ending on the 31st of the preceding December, and forward the returns to the county clerk; except that in Detroit the common council is to appoint persons especially for this work. In Pennsylvania the assessors

make the enumeration semi-annually. In Kansas, Maine, New Jersey, and Ohio the assessors make the enumeration annually, and in Massachusetts and Rhode Island the town clerks make the enumeration in January of each year; but in Providence the city registrar makes the enumeration semi-annually. This method is very unsatisfactory, and in the city of the writer skilled enumerators fail to obtain nearly forty per cent. of the births.

The usual method of securing birth records in the United States is to require reports from the attending physician or midwife.[1]

Usually it is the physician or midwife or accoucheur who is to report, and sometimes it is "any other person in charge," as in Maine. In Delaware[2] it is the "physician present at the birth of any child, or (if not present at the birth of the child) who attends the case of any mother during her lying-in period," . . . "and every midwife present at the time of, or within five days after the birth of any child, where no physician is attending said case." In Alabama, California, and in a few cities, as Brooklyn, New York, Chicago, Cleveland, Denver, Omaha, and the Pennsylvania cities of the second class, the physicians are to keep registers of all births attended.

Another method is to require the parents or householder to report the births of their children or such as occur in their families. Wisconsin is the only state which relies upon this method alone, and as the law only went into effect 1 July, 1897, it has never as yet had a fair trial in this country.[3] There are, however, a number of states in which the parents and head of the family are made equally responsible with the physician in reporting births, the same persons usually being specifically mentioned that are named in the corresponding sections of the law requiring reports of deaths. Sometimes the responsibility rests on both parent and physician, and sometimes the parent is required to report only when there is no physician or midwife in attendance. In New Orleans[4] "it shall be the duty of the father, or, in his default, of any person present at the birth of any child, to report within twenty-four

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[1] The following states have such laws upon their statute books: Alabama, California, Colorado, Connecticut, Delaware, Florida, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, North Dakota, Rhode Island, Utah, Vermont, Washington and Wisconsin. It is also required in the cities of Atlanta, Florence, S. C., Memphis, Mobile, Omaha, Philadelphia, the Pennsylvania cities of the second class, and Scranton.

[2] Delaware Revised Code (1893), p. 405 (Chapter 381, Vol. 16, Laws of Delaware.)

[3] This law was repealed in 1899, and reports are now required from physicians and midwives, as well as from parents.

[4] Louisiana, Chapter 80 of 1877, Sec. 9.

hours from the date of said birth, at the office of the board of health, such birth, which report shall be recorded in presence of two witnesses."

In Providence for a year or two before the enactment of the statute requiring physicians and midwives to report, physicians were requested to report births, and clergymen baptisms, and they were paid ten cents for each birth and baptism reported. With a little urging, reports were obtained from most of the Catholic and Episcopal churches and from many of the physicians. After the statute went into effect requiring reports from physicians, the report of baptisms was no longer sought, except from the French, Italian, and Portuguese churches. It is found that the reports from these churches are still needed to complete and correct returns received from other sources.

The Vermont statute provides that the head of a family moving into the state may have the births of his children recorded.

Examples of forms for birth returns are shown in Appendices 12 and 13.

Time Limit for Reports.

In California, Colorado, Delaware, and Utah the returns of births must be made by doctors and midwives quarterly. In Massachusetts parents must report in forty days. In Connecticut, Maryland, Massachusetts, and Rhode Island physicians must report monthly. In Connecticut and Rhode Island physicians and midwives must report during the first week of the next month, and in Maryland and Massachusetts during the first five days of the succeeding month. In Illinois, New Jersey, New York, Washington, and Wisconsin the time is thirty days; in Minnesota, Vermont, Cincinnati, Cleveland, the City of New York, Paterson, Pennsylvania cities of the second class, and Scranton, ten days, in St. Louis and Mobile, seven days, and in Maine, New Hampshire, and the District of Columbia, six days; in North Dakota, Chicago, St. Paul, and Memphis, five days, for midwives in Maryland four days; in Buffalo and Charleston, three days, and in Omaha and New Orleans, twenty-four hours. Promptness is evidently desired, but it is to be feared that it is frequently not obtained. Physicians, left to their own devices, are apt to be dilatory. Sometimes efforts are made to secure promptness otherwise than by the threat of penalties. In New Jersey the law requires that the assessors shall annually, in April, send to the physicians twelve stamped and addressed envelopes in which they shall send in their returns monthly. In Providence physicians are furnished with return envelopes, and doubtless this practice is followed in other cities. In Cincinnati the sanitary police keep a list of clergymen, doctors, and midwives, and call on them monthly for their returns. In Philadelphia there are two collectors of vital statistics who

visit practitioners of midwifery monthly to collect returns of births. Nevertheless the number of births recorded in these two cities is doubtless much less than the number which actually occurs. In Chicago, where the Illinois law has for twenty years required that doctors and midwives shall report births without compensation, the returns were very defective. Physicians would not take the trouble to make out a long report and send it in at their own expense without compensation. To lessen their labor the commissioner of health now distributes postal cards on which only the items necessary for identification are to be given. The form of card used is shown below.[1]

On receipt of this card the registrar proceeds to obtain from the parents the rest of the required information; by this means the commissioner, Dr. Arthur K. Reynolds, succeeded in a few months in securing a twelvefold increase in the number of births reported. Another method of securing an interest in the subject and consequently better returns may be described in the commissioner's words:

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[1] REPORT OF A BIRTH.

"SECTIONS 1485, 1486, of the Laws and Ordinances of the City of Chicago, require that any Physician, Midwife or other person who attends upon a birth shall report the same to the DEPARTMENT OF HEALTH within five [illegible] days after its occurrence.

Filling out this Card and its deposit in a letter box will fulfill the requirement and avoid the penalty for neglect.

The Recorder of Birth[illegible] [illegible] Cards [illegible] request.

To the Recorder of Births: Chicago, 189[illegible]

DOCTOR: A living [illegible] child was born to

1. Male or female. Parentage, if other than White.

[illegible]

2. Full name of the Parent.

at [illegible] Ward

3. Exact address of place of birth.

on the [illegible] day of [illegible] 189[illegible]

[illegible]

Attendant [illegible]

[illegible]

[illegible]

[illegible] Write in the numbered blank spaces above:—

1. [illegible] If the child is not of white parentage, add, after [illegible] as the case may be [illegible] 2. Full name of Mother [illegible] Street, and number of Ward. 4. Day and [illegible] Attendant of a Physician, add the letters M. D.

"With a view to increasing interest, and so to securing fuller returns, the Commissioner obtained the publication in some of the city evening papers of all births reported, on representing to the editors that birth notices should be as interesting to their readers as 'death notices,' to which space is readily given. Such hesitation as was met with at once yielded when it was urged that a knowledge of the city's birth rate was important for various reasons, that the publication of births would aid in securing such knowledge, and that it was a recognized function of the public press to secure and publish information of service to the public interests as well as to the individual.

Publication was begun on August 12th, and the results were at once apparent. During the 76 days prior to August 15th there were 5,122 births reported — an average of 67 per day. During the succeeding 76 days, up to the close of October, 6,852 births were reported — an average of 90 per day, and an increase of 34 per cent.

The publication embraces the name of mother and her residence, sex of child (son or daughter), and name of attendant. To meet the objection of some physicians to the alleged quasi-advertising flavor of this publication it was found necessary to furnish a special card for the exclusive use of physicians; and the card first prepared — copy above given — is now used by midwives only.

This *Physician's Report of a Birth* card has the letters 'M. D.' added to the line for the attendant's name and the following note at the bottom of the card:

'IF THE PHYSICIAN NOTES AN OBJECTION TO THE PUBLICATION OF THIS BIRTH, OR OF HIS NAME AS ATTENDANT, THE OBJECTION WILL BE RESPECTED.'"

If physicians report births promptly, they certainly cannot, in many cases, give the name of the child. To obtain this for the record it is necessary for the recording officer to communicate with the parents. For this purpose special blanks are often provided. The form used in Maine is shown in Appendix 15.

Items required for Birth Records.

For purposes of identification a birth record should have the

Name,
Sex,
Date of Birth,
Place of Birth,
Parents' Names and Parents' Residence.

A considerable number of other items are desirable both for identification and for scientific purposes.

Date of birth.

Under this heading it is often specified that the hour of birth shall be given, and sometimes, as in Wisconsin, the day of the week as well as the day of the month.

Maiden Name of Mother is required in almost all records of births.

Father's Occupation is also very useful for identification and is frequently required.

Name of Physician or other Reporter is always to be signed to returns of birth made by them, and in Connecticut and a few other places the physician's address is to be given also.

Date of Certificate is often required, as is also the
Date of Return.

Sometimes, as in Massachusetts, the date of return or of filing the return is to be noted on the back.

A serial number is often placed on returns beginning with the first return of each year.

A number of other items are sometimes added for the sake of their scientific interest. Among them are

Color, which is required in most returns.

Race is required in Alabama and California.

Color of Parents is required in Connecticut, Maine, New Hampshire and Rhode Island.

Nativity of Parents is required in Connecticut, Michigan, Minnesota, New Jersey, and the District of Columbia.

Birthplace of Parents.

Instead of nativity, birthplace is required in Maine, Massachusetts, New Hampshire, Pennsylvania cities of the second class, Rhode Island, Wisconsin, Cleveland, and the City of New York.

Parents' Age is required in Delaware, Connecticut, Minnesota, New Hampshire, Rhode Island, Cleveland, and the City of New York.

Number of the Child of the Mother, that is the number of children the mother has had, including the one named in the return. This as well as the preceding is useful for identification, but it is chiefly for its scientific value that it should be recorded. It is required in Connecticut, Delaware, Iowa under the old law, Maine, Minnesota, New Hampshire, New York, and Rhode Island. In New Jersey the number of children by this marriage are required, and in Wisconsin "the names of other issue living (born of the same parents)." In New York in addition to the number of children born the number now living is required. When the number of children is required together with the age of the mother, valuable information can be obtained in regard to fertility at different ages. When the number of the child and nativity or birthplace of the parents is obtained together with their ages, much may be learned of the fertility of different nationalities.

Child's Number in the Family is required in Delaware and must be of value from a sociological point of view as showing the size of the family.

Still-born.

Whatever is done with still-births, whether they are recorded with births, with deaths, or separately, it is often considered advisable to provide on birth returns opportunity for designating whether or not the child is still-born. Such an item is found in Colorado, Kentucky,

Maine, New Hampshire, and the District of Columbia, and special blanks for still-births are used in New Jersey, New York, in Iowa under the old law, and in Pennsylvania. In Rhode Island and Wisconsin the fact of still-birth is to be noted under "remarks" as it doubtless is in other places.

Illegitimacy.

This condition has received little recognition in American registration laws. In Virginia the law requires the name, occupation and residence of the father "if the child be born in wedlock" and presumably they are to be omitted, if not so born. In New Jersey and New York if the child is born out of wedlock and the father's name is not given the letters O. W. are to appear on the return. In Iowa, under the old law, it was to be stated whether the child was born in wedlock or not.

The Massachusetts law is as follows :[1]

"In the record of the birth of an illegitmate child the name and other facts relating to the father shall not be recorded unless at the joint request in writing of both father and mother. The term 'illegitimate,' shall not be used in the record of a birth unless the fact has been legally determined or upon the sworn statement of both the father and mother."

In Rhode Island and Wisconsin illegitimacy is to be noted in the space on the return left for remarks.

Part Presenting is to be noted on returns of births in Mobile.

STILL-BIRTHS.

Still-births may be recorded as births, or as deaths, or as both, in Massachusetts, Rhode Island, Vermont, and sometimes in Connecticut, and in each event the usual blank for returning births and deaths is employed. In Massachusetts it is required that the word still-born shall be entered in the record of both birth and death. But in some states and cities special blanks are used which differ somewhat from those used for either births or deaths. The form used in New Jersey is shown in Appendix 16 and is substantially the same as that used in other places.

MARRIAGES.

While the registration of marriages bears no immediate relation to sanitary science or practice, it is considered in this connection because the registration is usually performed by the same officer who registers births and deaths, and because it seems to the writer that there is no question that these latter should be registered by the sanitary officers,

[1] Massachusetts, Chapter 444, of 1897, Sec. 1.

at least in all municipalities of considerable size, and perhaps in all communities.

There is little doubt that a most important requisite for complete registration is a requirement that a license shall be issued to the contracting parties before the marriage is solemnized. Clergymen, justices of the peace and others authorized to solemnize marriages are probably as forgetful and careless as other people. Under the most favorable circumstances a certain number of certificates of marriage are not returned by the officiating parties as required. If complete returns are desired everything should be done to facilitate the return of the certificate. If the clergyman has a blank already filled except for one or two small items, he is less likely to neglect to return it than if an extended form has to be filled by him. It is also important that the marriage record should be accurate as well as complete. The registration officer is much more likely to feel the necessity of this than is the person who officiates at the marriage. Experience has amply proven that records of marriage are much more nearly accurate when they are made from a license prepared in the record office and requiring only the signature of the person officiating to become a certificate of the marriage. The following data in regard to marriages are largely taken from a special report on "Marriage and Divorce" prepared by Hon. Carroll D. Wright, United States Commissioner of Labor.

The following is a list of the states and territories which require a license as a preliminary to marriage, also the officer who issues the same and the fee required:

State.	Officer Issuing.	Fees.
Alabama	Probate Judge	$1 50
Arizona	Probate Judge	50
Arkansas	Clerk of County Court	2 50
California	County Clerk	2 50
Colorado	County Clerk	1 00
Connecticut	Registrar, Births, Marriages, Deaths	50
Delaware	Clerk or Justice of Peace	$2 33—2 83
District of Columbia	Clerk of Supreme Court	1 00
Florida	Clerk of Circuit Court	2 00
Georgia	Ordinary, or Clerk to Ordinary	1 50
Idaho	County Recorder	1 00
Illinois	County Clerk	1 00—1 50
Indiana	Clerk of Circuit Court	2 00
Iowa	Clerk of Circuit Court	1 00
Kansas	Probate Judge	2 00
Kentucky	County Clerk	1 50
Louisiana	Clerk of District Court	2 00
Maine	Town Clerk	50
Maryland	Clerk of Circuit Court	1 00
Massachusetts	Town Clerk or Registrar	50
Michigan	County Clerk	50

State.	Officer Issuing.	Fees.
Minnesota	Clerk of District Court	$2 00
Mississippi	Clerk of Circuit Court	3 00
Missouri	County Recorder	1 00
Montana	Probate Judge	2 00
Nebraska	County Judge	1 50
Nevada	County Clerk	2 00
New Hampshire	Town Clerk	1 00
New Jersey*	County Clerk	50
North Carolina	Registrar of Deeds	1 50
Ohio	Probate Judge	75
Oklahoma	Probate Judge	
Oregon	County Clerk	2 00—2 67
Pennsylvania	Clerk of Orphans Court	50
Rhode Island	Town or City Clerk	1 00
Tennessee	Clerk of County Court	1 00
Texas	Clerk of County Court	1 50
Utah	Clerk of Probate Court	2 25
Vermont	Town Clerk	50
Virginia	Clerk, County, City, or Corporation Court	1 00
Washington	County Auditor	3 00
West Virginia	Clerk of County Court	1 00
Wisconsin	County Clerk	50
Wyoming	County Clerk	3 00

*A license is required only when both parties are non-residents.

In Alabama, Georgia, Florida, Kentucky, Indiana, Minnesota, Mississippi, Ohio, Oregon, Virginia, West Virginia, and Wisconsin, the license is issued in the county in which the woman resides. In Tennessee it is to issue from the county where the woman resides or where the marriage is solemnized. In Connecticut, Illinois, Louisiana, Maryland, Montana, Nebraska, North Carolina, Pennsylvania, and Wyoming, it is issued in the county or town where the marriage is to take place. In Michigan the license is issued in the county in which either party resides, and in Nevada in the county in which both or one of the parties resides. In Massachusetts, Maine, New Hampshire, and Rhode Island a license must be obtained from the town in which each of the parties resides, and in Vermont from the town in which the groom resides, or if he lives out of the state from the town in which the bride resides. In the New England states and Minnesota, if the parties are non-residents, and in Virginia, if the bride is a non-resident, the license is to issue from the town or county in which the marriage takes place. In Nevada if the parties are non-residents the license may issue from any county. In Wisconsin the license must be obtained five days before the ceremony. This is the only state with such a requirement.

Of the officers who issue marriage licenses all but five record the certificates after they are returned. The five are in California, Delaware, Nevada, and Wisconsin, where the marriage is recorded by the recorder of deeds, and in Washington, where it is recorded by the probate judge. In the New England states the license is called a certificate, which term is also applied to it when it is returned with the clergyman's endorsement upon it. Some confusion is apt to arise unless this unfortunate use of the words is kept in mind.

There are two [illegible] in requiring marriage licenses [illegible] to secure completeness and accuracy of returns, the other is to prevent the marriage of persons which is unlawful [illegible] marriage. Several states do not require a license when public notice of the marriage has been previously given by the publication of banns. This is the law in Delaware, Georgia, Maryland, and Ohio. The following is the law in Maryland: "The name of the parties intending to be married shall be three times published in some church or house of religious worship in the county where the woman resides, on three several Sundays, by some minister residing in said county." In Delaware this is not required in the case of a marriage of colored persons. In Delaware and Ohio the banns must be published at least ten days prior to the marriage. It is evident that in the minds of the framers of such laws the registration of the marriage was a minor matter.

Contents and Form of Marriage License.

The use of a marriage license is to make sure an accurate return of marriage from the person officiating. The data necessary for record are upon it and all the clergyman or other person officiating has to do is to certify as to the marriage. The marriage license is a basis for the marriage record, and should therefore contain all the data necessary for such record. There is rather more uniformity in regard to the items required for records of marriages than for the records of either births or deaths. The most essential and usual items to be found on marriage licenses are as follows:

Groom.

- Name.
- Occupation.
- Residence.
- Birthplace.
- Age.
- Color.

Bride.

- Name.
- Maiden name if previously married.
- Residence.
- Birthplace.
- Age.
- Color.
- Civil Condition of the groom and bride.

A statement [illegible] always required. [illegible] whether the marriage is the first, second, or other marriage.

Occupation of the Bride.

This is required in Maine, Massachusetts, New Hampshire, New Jersey, and Rhode Island.

Age of the Parties.

Sometimes the age is to be given in years, months and days, sometimes the age at the next birthday, as in Iowa and Buffalo, and sometimes the age at the nearest birthday, as in New Jersey. If not otherwise expressed, the age in years at the last birthday is intended. In Providence it is the custom, though not required by law, to state the date of birth as well as the age in years.

Data Concerning Parents.

The names of the parents of the contracting parties are in most states to appear on the license.

Color of Parents,

Occupation of Parents,

Birthplace of Parents.

In Connecticut the nationalty of the parents is required instead of birthplaces.

Age of Parents.

This is required in New Hampshire.

The marriage license must also have the date and place of issue, and must have the written and signed statement of the licensing officer that the license has been duly recorded or the "intention declared."

A certificate or return of marriage must of course have other items besides the family history required for the license. The license, in those states where a license is required, becomes a certificate by the written statement upon it by the person officiating that the parties named have been legally joined in marriage. The items required on a certificate of marriage are as follows:

Date of Marriage,

Place of Marriage,

Signature of Person officiating.

Other items are often required.

Official Position or Denomination of the person officiating.

This is usually required, and in Rochester the name of the church to which the clergyman is attached. In Delaware the "ceremony employed" is required. The following is the Massachusetts law:[1]

"The words 'official station,' as used of a person solemnizing a marriage, in chapter three hundred of the acts of the year eighteen hundred and ninety-two, shall be taken and deemed to mean the office by virtue of which said person solem-

[1] Massachusetts, Chapter 424 of 1897, Sec. 5.

nizes such a marriage; and to describe such office in returns of marriages the words 'justice of the peace,' 'minister of the gospel,' 'clergyman,' 'priest,' or 'rabbi,' only shall be used."

In Rhode Island, where the term "official station" occurs in the law, it is interpreted to mean in the case of clergymen, the denomination.

Other items occasionally noted are

Names of Witnesses to the ceremony.

These are often required to appear on the returns of marriage, but they are not so required in Connecticut, Delaware, Maine, Massachusetts, and New Hampshire.

Residence of Witnesses.

This is required in Michigan, New Jersey, and Rochester.

Residence of Person Officiating.

This is a requirement in Maine, Massachusetts, New Hampshire, and New York.

A form of marriage license may be found in Appendix 17.

Most states have a considerable number of regulations as to who shall marry, such as the prohibition of consanguineous marriages, limitations as regards the marriage of minors and divorced persons, but these have no special interest in this connection. They must of course be followed by the officers who issue the licenses, and means are often provided by law for ascertaining the facts, such as administering oaths, etc. Limitations as to the marriageable age of minors are very common and vary considerably in different states. Nearly all require the consent of parents or guardian and the following states require a written consent which is presumably filed by the officer issuing the license: California, Connecticut, Georgia, Iowa, Maine, Montana, New Jersey, North Carolina, Oregon, Rhode Island, Tennessee, Vermont, Washington, and Wisconsin.

In Alabama, Arkansas, Kentucky, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New Mexico, Ohio, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming, the minor's permit may be either verbal or written.

In the states named below[1] the law requires that the person solemnizing a marriage shall keep a record thereof.

In Alabama and Mississippi, when a marriage is solemnized by the pastor of any religious society, the clerk or keeper of the minutes of

[1] California, Colorado, Delaware, Idaho, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New Mexico, New York, South Dakota, Wisconsin.

such society is required to make a record of such marriage in a book to be kept for that purpose.

In Maryland the certificate of agreement of the parties to a Quaker marriage, signed by at least twelve witnesses, must be recorded among the records of the society, or in some court of record in the city or county where the marriage occurred.

In Ohio, in cities which are co-extensive with the counties in which they are situated, persons authorized to solemnize marriages are required to keep a record thereof.

The usual way of keeping such a register is by means of stubs.

Nearly all states require that the person solemnizing a marriage shall make a return thereof to some officer who is to record the same; but in New Jersey there is no provision for record after return. Below[1] is a list of the states requiring such return with the name of the officer to whom the return is made. An example of a marriage return is shown in Appendix 18.

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[1] In those states marked with an * the return is made to the same officer who issues the license.

State or territory.	Return made to—	State or territory.	Return made to—
*Alabama	Judge of probate. (*a*)	*Mississippi	Clerk of circuit court. (*c*)
Arizona	County recorder. (*a*)	*Missouri	County recorder. (*c*)
*Arkansas (*b*)	Clerk of county court. (*a*)	*Montana	Probate judge. (*a*)
California	County recorder. (*c*)	*Nebraska	County judge. (*a*, *c*)
*Colorado	County clerk.	Nevada	Recorder of deeds. (*c*)
*Connecticut	Registrar of births, marriages and deaths. (*a*)	*New Hamp	Town clerk. (*a*)
		New Jersey	Local board of health.
Dakota (North)	City or town clerk, or register of deeds.	New Mexico	Clerk of probate court. (*c*)
		New York	Local board of health.
Delaware	Recorder of deeds. (*c*)	*NorthCarolina	Registrar of deeds. (*a*)
*D. of Columbia	Clerk of supreme court.	*Ohio	Probate judge. (*a*)
*Florida	Clerk of circuit court.	*Oregon	County clerk. (*c*)
*Georgia	Ordinary. (*a*)	*Pennsylvania	Clerk of orphan's court. (*a*, *c*)
*Idaho	County recorder. (*c*)		
*Illinois	County clerk. (*c*)	*Rhode Island	Town or city clerk or registrar. (*c*)
*Indiana	Clerk of circuit court. (*c*)		
*Iowa	Clerk of circuit court.	*Tennessee	Clerk of county court. (*a*)
*Kansas	Probate judge. (*a*)	*Texas	Clerk of county court. (*a*)
*Kentucky	County clerk. (*a*)	*Utah	Clerk of probate court. (*a*)
*Louisiana	Clerk of district court. (*a*)	*Vermont	Town clerk. (*a*)
*Maine	Town clerk. (*a*, *c*)	*Virginia	Clerk of county, city, or corporation court. (*a*)
*Maryland	Clerk of circuit court. (*a*)		
*Massachusetts	Town clerk or registrar. (*a*, *c*)	Washington	Probate judge. (*c*)
		*West Virginia	Clerk of county court. (*a*)
*Michigan	County clerk. (*a*)	Wisconsin	Register of deeds. (*a*, *c*)
*Minnesota	Clerk of district court. (*c*)	*Wyoming	County clerk. (*c*)

a Of the county, town, etc., whence license issued.

b The return must be made by the person who obtained the license.

c Of the county, town, etc., wherein the marriage is solemnized.

In South Dakota the provisions for returns of marriage are not compulsory. The statutes provide that a certificate may be obtained from the person solemnizing a marriage upon the request of either of the parties, and may be filed with the clerk of the city or town where the marriage occurred, or where either of the parties resides, or with the registrar of deeds.

In Iowa, when the services of a clergyman or a magistrate are dispensed with, the husband must make the return.

In New York such return shall be made by the person solemnizing or by the "groom."

In the following states the return of marriage is to be made to the town or county where the license is issued: Alabama, Arizona, Arkansas, Connecticut, Georgia, Kansas, Kentucky, Louisiana, Maryland, Michigan, Montana, New Hampshire, North Carolina, Ohio, Tennessee, Texas, Utah, Vermont, Virginia, and West Virginia. The return is to be made to the town or county where the marriage is solemnized in California, Colorado, Delaware, Idaho, Illinois, Indiana, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire (for non-residents), Nevada, New Mexico, Oregon, Rhode Island, Washington, and Wyoming. In Maine, Massachusetts, Nebraska, Pennsylvania, and Wisconsin, a return must be made by the person solemnizing the marriage to the town or county where it was solemnized and also to the town where the license was issued.

The time within which marriage returns must be made is usually a month or thirty days, but in the District of Columbia it is forty-eight hours; Indiana and Memphis, five days; Maine, six days; Wilmington, ten days; Pennsylvania cities of the second class on the third day of each quarter. In Philadelphia the collectors of vital statistics, and in Cincinnati the sanitary police call upon the clergymen for them at regular intervals.

Sometimes, as in Kansas, in addition to the returns of clergymen the assessors make an annual enumeration of marriages together with births and deaths.

In addition to the requirements of the territorial statutes on the subject of marriage records it is provided by act of Congress, Approved March 3, 1887 (24 Stat., 636), that in all the territories a certificate of every marriage performed therein, signed by the parties and by the person solemnizing, be filed by such person in the office of the probate court, or, if there be none, in the office of a court having probate powers, in the county or district where the marriage occurred, which certificate shall be immediately recorded."

In a few states provision is made for the return of marriages celebrated beyond the limits of the state.

In Maine the statutes provide that when residents of the state are married in another state and return to the state to reside they shall file a certificate or declaration of their marriage with the clerks of the towns in which they respectively lived. "In Massachusetts and New Hampshire, under similar circumstances, it is provided that such certificate shall be filed with the clerk of the town where either of them lived. In Vermont, when a male resident of the state is married without the state, the statutes require that he shall deposit with the clerk of the town where he resides a certificate embracing the statistics required by law in marriage certificates. The statutes also provide that the head of a family who moves into and becomes a permanent resident of the state may cause a certificate of his marriage to be recorded in the office of the clerk of the town where he resides.

In Virginia and West Virginia it is provided that if either or both of the parties to a marriage celebrated without the state be residents of the state, a certificate or statement of such marriage, verified by the affidavit of a witness thereto, may be returned to the clerk of court of the county or corporation where the husband resides (or if he be not a resident of the state, where the wife resides), and an abstract thereof shall be recorded by such clerk as in other cases.

In Wisconsin, where any marriage celebrated in the state shall not have been returned and registered as provided by law, or when any person may have married, who was a child of a citizen of the state, or when any person so married elsewhere was before or at the time of such marriage, or subsequently thereto shall have become, a resident of the state, upon presenting and filing with the proper register of deeds proofs of marriage, either by the affidavit of the person performing the ceremony, or if such proof can not be made, then by affidavit of a witness or witnesses thereto, such register shall enter the facts so proved upon his marriage register."

It is not at all likely that compulsory laws like those of Maine, New Hampshire, Vermont, and Massachusetts can be thoroughly enforced. It is possible perhaps in towns with a small population where most of the inhabitants are known to the register, but not in cities. It certainly is not enforced in the large Massachusetts cities.

RETURNS AND RECORDS.

False Returns.

It is of course a very grave matter for a person to make a false return of a birth, marriage or death. Penalties are provided for such an offense in Maine, Massachusetts, Michigan, New Jersey, Wisconsin,

and in the City of New York, and other cities. The following is the New Jersey law:[1]

"That any minister of the gospel, magistrate, physician, midwife or other person, who shall knowingly make any false certificate of marriage, birth or death, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be liable to a fine not exceeding one hundred dollars or imprisonment in the county jail for a period not exceeding three months, or both, at the discretion of the court."

The Massachusetts law affixes a penalty for altering a marriage certificate.

In Connecticut a penalty is imposed upon the registrar for making a false entry.

Original Returns.

It is frequently prescribed that these shall be written legibly, spelled correctly, and written in ink. The former of these requirements is difficult to have fulfilled, but the latter certainly should be insisted on.

The time of receiving or filing the original returns by the town or county clerks is sometimes to be endorsed upon the return as in Connecticut, Massachusetts, Michigan, and Wisconsin. A place for this endorsement is printed on the back as on the Massachusetts returns.

Often a blank is left for a number, and in Michigan the registrar is required by law to "number all certificates consecutively in the order in which they are received, beginning with number 1 for the first death which occurs in each year." This is doubtless of assistance to the secretary of state to whom the returns are sent, and who has to certify to the county auditors the amount due each registrar for making returns. Sometimes the number of the burial permit is to be stamped upon the return of a death.

The original returns are usually filed and preserved by the registrar who receives them. This is the rule in all the New England states. In some cases these originals serve as the permanent record and are bound and indexed. This is the method of keeping the record in the City of New York.

In New York state and in Michigan the originals are at once recorded by the local registrar and returned monthly to the state registrar by whom they are indexed, bound and preserved.

In New Jersey there is no provision in the law for local record, though one is made in very many places, but the returns are to be sent to the state bureau of vital statistics, and the law provides that they shall be arranged according to political divisions. In the above states exception is made for certain cities which may send transcripts

[1] New Jersey, General Statutes (1895), p. 2010, Sec. 11.

to the state registrar and preserve the originals. In Minnesota the original returns are to be sent by the secretary of state to the county clerks. In Wisconsin returns are received by the board of health or town clerks and sent to the registrar of deeds for the county. The law does not require local record.

The preservation of original papers, like returns of births, marriages and deaths, presents quite an important problem. These must in the course of years become so great in number that it will be with difficulty that proper storage room can be found for them. It is a question whether it is not best to record in books every item contained in them and then destroy them.

Blanks for Returns.

These are almost always furnished by the state. It is only in this way that uniformity can be secured. They are usually distributed to clergymen, undertakers, physicians, and the like by the town or county clerks or other recording officers. Usually the blanks are furnished by the state board of health, as in Arkansas, California, Colorado, Florida, Illinois, Indiana, Kansas, Maine, Maryland, Missouri, New Hampshire, New Jersey, New York, Rhode Island, Vermont, West Virginia, and Iowa for marriages; but in Massachusetts, Michigan and Wisconsin they are furnished by the secretary of state, and in North Dakota and Virginia by the state auditor. In Pennsylvania, except in the large cities, blanks are to be furnished by the county commissioners; but in Delaware the county recorder is to furnish the blank returns.

In some states in which there are no general registration laws, as Georgia, South Carolina, Tennessee, and others like Pennsylvania where the laws are very imperfect, there are nevertheless important cities which have long had a good system of registration and which for their blanks, books and laws have to depend upon themselves alone.

Recording Officers.

In nearly every instance the officer to whom returns of births, marriages, and deaths are made is to record them. This record, however, is not required by statute in some states, as Florida, New Jersey, and Wisconsin, and in certain cities. The following is a list of the officers who are *ex-officio* charged with the duty of recording vital statistics in the different states:

State.	Receiver.	Recorder.
Alabama	County Health Officer	County Health Officer.
California	County Recorder	County Recorder.
Colorado	Board of Health.	.....
Connecticut	Town Clerk	Town Clerk.
Delaware	Recorder of Deeds	Recorder of Deeds.

State.	Receiver.	Recorder.
Florida	State Board of Health.	.....
Illinois	County Clerk.	County Clerk.
Indiana	Health Officer.	Health Officer (undertakers are registrars in unincorporated places).
Iowa	Clerk Dist. Court.	Clerk Dist. Court.
Kentucky	County Clerk.	County Clerk.
Maine	Town Clerk.	Town Clerk.
Maryland	Health Officer.	Health Officer.
Massachusetts	Town Clerk.	Town Clerk.
Michigan	Health Officer.	Health Officer.
Minnesota	Health Officer.	Health Officer.
Mississippi	County Board of Health.	County Board of Health.
Montana	County Clerk.	County Clerk.
New Hampshire	Town Clerk.	Town Clerk.
New Jersey	Town Clerk or Assessor.	.....
New York	Board of Health.	Board of Health.
North Carolina	County Supt. of Health.	County Supt. of Health.
North Dakota	Health Officer.	Health Officer.
Pennsylvania	Clerk Orphan's Court.	Clerk Orphan's Court.
Rhode Island	Town Clerk.	Town Clerk.
Utah	County Clerk.	County Clerk.
Virginia	County Clerk.	County Clerk.
Vermont	Town Clerk.	Town Clerk.
Washington	County Auditor.	County Auditor.
West Virginia	County Clerk.	County Clerk.
Wisconsin	Health Officer or Clerk.	County Register of Deeds.

In place of the above mentioned officers other persons are sometimes to perform these duties. Thus in Ohio in villages and cities the board of health, and in New Hampshire the board of health of cities, is to record births and deaths. In New Jersey it is the registrar or clerk of cities who is to receive returns, and such may record the same, and the registrars of Michigan cities may keep the original returns and send copies to the secretary of state.

In many cities provision is made by charter or otherwise for the appointment of special officers to be registrars of vital statistics. Among such cities are Atlanta, Boston, Buffalo, Camden, Chicago, Cincinnati, the District of Columbia, Lowell, Milwaukee, New York, Philadelphia, Paterson, Providence, Portland, Me., Rochester, Syracuse, and Wilmington, Del. Among the smaller communities which have a registrar is Asbury Park, N. J.

Sometimes as in Buffalo, Memphis, and the District of Columbia, the registrars are merely clerks in the department of health. Usually the registrar is a member of that department, but in Boston and Providence he is an independent officer, but in Providence the same person has usually been elected registrar and executive officer of the health department.

As it is sometimes necessary for registrars to administer oaths, to determine the truth of statements made to them, this power is often granted to them and they may sometimes have a seal as in Connecticut and in Boston.

Records.

Most laws require that births, marriages, and deaths shall be recorded in separate books, though as has been stated in a few instances the original returns serve as the record. In Pittsburgh the record page for deaths has space for only two records which are fac-similies of the original returns.

When any considerable number of items are to be entered, a single page scarcely gives space enough without making the record book entirely too cumbersome. Hence these records usually extend across two pages which have the same number. The folio has a proper heading and is ruled into columns for the various items which are usually prescribed by statute or by the state registration officer. The record books themselves are also often furnished by the state, as in Massachusetts and Delaware, by the secretary of state; Rhode Island, by the state board of health; Washington and Minnesota, by the county auditor; and in Ohio by the county judge. In this way uniformity is secured and a better paper and printing is obtained.

In many records there is a space at the bottom of every page for the signature of the registrar attesting that the record is correct.

In some states as Maine, New Hampshire, and Rhode Island returns are to be recorded "chronologically." In Rhode Island this is interpreted to mean in the order in which the events occurred. So that the record for a given period of time cannot be made until sufficient time has elapsed for all the returns to be in. In Delaware the returns are to be recorded "under the letter of the alphabet to which they respectively belong." In Virginia they are to be alphabetically arranged. In most regulations concerning this point records are to be made in the order in which the returns are received.

Deaths of paupers shall be especially designated as such in records in Mobile.

In Rhode Island the law requires that births, marriages, and deaths of residents and non-residents shall be recorded separately. This is interpreted to mean that the births, marriages, and deaths in the families of the residents of the town, but occurring out of the town shall be recorded separately from those which occur in the town. It is important that such should be recorded, but they should not of course be reckoned in any tables of vital statistics. In Providence deaths in the

city of persons of foreign parentage, are recorded separately from those of American parentage.

The problem of dealing with the deaths in prisons, hospitals, and almshouses is a difficult one. In Massachusetts [1]

"The superintendent of the state almshouse shall obtain, record, and make return of the facts in relation to the births and deaths which occur in his institution, in like manner as is required by town clerks. The clerk of a town in which such almshouse is located shall, in relation to the births and deaths of persons in said almshouse, be exempt from the duties otherwise required of him by this act."

It is of the greatest importance that records should be as permanent as possible, and to secure this only the most durable paper and ink should be employed. If the state furnishes the record books there is no reason why they should not always be of the best, but it is feared that this is far from the case. In regard to paper the Massachusetts law provides as follows: [2]

"The matters of public record in any office shall be entered or recorded on paper made wholly of linen, of a firm texture, well sized, and well finished; and in the selection of paper for such records a preference shall be given to linen paper of American manufacture, if it is marked in water line with the word 'linen,' and also with the name of the manufacturer."

Ink is very apt to be poor in quality, to injure the paper and fade rapidly. Massachusetts and Connecticut have prescribed what ink shall be used. The following is the law in those states: [3]

"SECTION 1. No person having the care or custody of any book of record or registry in any of the departments or offices of the Commonwealth, shall use or allow to be used upon such books any ink excepting such as is furnished by the secretary of the Commonwealth.

"SEC. 2. The secretary of the Commonwealth shall from time to time advertise for proposals to furnish the several departments and offices of the Commonwealth in which books of record or registry are kept with ink of a standard and upon conditions to be established by the secretary at such periods and in such quantities as may be required, and may contract for the same.

"SEC. 3. The ink so furnished shall be examined from time to time by a chemist to be designated by the secretary of the Commonwealth, and if at any time said ink shall be found to be inferior to the established standard the secretary shall have authority to cancel any contract made for furnishing said ink, and the quantity so found inferior shall not be paid for."

It is sometimes prescribed that records shall be written, but if that is intended to exclude typewriting it is not a wise provision. Type written records are more legible and take up considerable less space than written records. Moreover, a black carbon ribbon gives a more

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[1] Massachusetts, Chapter 444 of 1897, Sec. 22.

[2] Massachusetts, Public Statutes (1882), Chapter 37, Sec. 1.

[3] Massachusetts, Chapter 378 of 1894.

permanent and unalterable record than can any fluid ink. The type writer has been used for records in Providence since 1890. The sheets are written separately and bound in temporary covers until enough have accumulated for permanent binding.

In Michigan towns the death permits are furnished the towns in books with stubs and the stubs are to be kept as the local town record. See examples of forms of records in Appendices 19 to 21.

Index.

A record without an index loses a large part of its value. Hence the indexing of records is usually required. As was stated above, in Delaware and Virginia the returns are recorded alphabetically, but in Delaware there must besides be an index for each book. Usually in the records of births, marriages and deaths, each volume is indexed separately and the names are indexed as they are recorded under the initial letter only. This method has not such very serious defects in small places where one book serves for a great many years; but for large places it is almost valueless. Even when an index is strictly alphabetical and yet only covers a year or other brief period, the labor of searching records is considerable. In New York City until recently, and in Buffalo and some other cities, the Lusk system of index is in use; in the District of Columbia and Hartford, the Burr index; in Lynn, the Schlicht; in Rochester, the Graves; and in Pittsburgh, Stephens and McKees index is used. All of these are book indexes. The book which is used as an index has margin letters which are so arranged that the names may be entered in small groups which are strictly alphabetical and which are so small that it is easy to run the group through for any particular name. It, however, takes some care to enter the names properly. In the borough of Manhattan, a temporary card index, which is strictly alphabetical is made, and from it an index is printed each month, and the pages are so arranged that the different months of of the same letter are bound consecutively in the annual volume. The cost of printing the annual index of about 200,000 names is some $6,000. In Manhattan a card index of deaths by streets is kept to facilitate the search for foreign names which are so often spelled erroneously.

By far the best index is the card index, and there is no good reason why this should not be universally employed. The labor of making a card index is no greater than that of making any other index; in fact, it is rather less, and it may be made to extend over any desired period of years. The only limit is the amount of space available. When the index becomes too large it should be printed. To print one hundred copies of an index from cards ought not to cost over one and one-

State Registration of Vital Statistics.

Some sort of a state registration of vital statistics is found in most of the more populous states. In the majority of them it is true the results are of very little value owing to the very defective returns, particularly the returns of births. According to Dr. Cressy Wilbur,[1] the following states had in 1895 an approximately correct registration of deaths: Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Since then, by the exertions of Dr. Wilbur and Dr. Hurty, Michigan and Indiana have been added to the list. The registration of marriages is more defective than that of deaths, and the registration of births is more defective still, and probably not even approximately correct in any state.

The following is a list of states in which there is an attempt at state registration together with the officer having charge of it:

Alabama	State board of health.	Minnesota	State board of health.
Arkansas	State board of health.	Mississippi	State board of health.
California	State board of health.	New Hampshire	State board of health.
Colorado	State board of health.	New Jersey	State board of health.
Connecticut	State board of health.	New York	State board of health.
Delaware	State board of health.	North Carolina	State board of health.
Florida	State board of health.	North Dakota	State baard of heolth.
Indiana	State board of health.	Rhode Island	State board of health.
Iowa	State board of health.	South Carolina	State board of health.
Kansas	State board of health.	Utah	State board of health.
Kentucky	State auditor	Vermont	State board of health.
Maine	State board of health.	Virginia	State auditor.
Maryland	State board of health.	Washington	State board of health.
Massachusetts	Secretary of state	West Virginia	State board of health.
Michigan	Secretary of state	Wisconsin	State board of health.

In order to have state registration, reports must be made by the local registrars to the central office. As has been shown, the original returns are sent to the state registrar in New York, New Jersey, and in Michigan so far as deaths are concerned. In other states copies of the returns are sent, as in Connecticut, Maryland, Maine, and New Hampshire. In Connecticut the copies are on cards, white, for births; blue, for still-births; brown, for marriages; and buff, for deaths, so that they can be easily arranged alphabetically or otherwise. For an example of these cards see Appendix 23.

In most states a copy of the record book is made on folios of the same size and ruling, and then is sent to the state registration office. In Providence the original record and the copy are made at the same time on a typewriter. The Fisher book-typewriter is at present used for this. In other states the copies are made on one side only. Some-

[1] American Public Health Association, Reports and Papers, 1896, p. 237.

times the state registrar requires that if all blanks are not filled the reason must be given in a letter to accompany the report.

Envelopes are furnished by the state for these returns and often a memorandum of the number of births, marriages, and deaths reported is to accompany the returns.

It is important for the state registrar to have a report regularly from each local registrar, whether any records are made or not. When no returns of births, marriages, and deaths are received by the local registrar, a special form of report is sent in. Thus in Connecticut, where cards of different colors are used for state returns of births, marriages, and deaths, a special card of another color still, but of the same size, is used when no returns have been received.

In certain states, besides the copies of returns or records, which are sent annually to the state registrar, monthly summaries of births, marriages, and deaths are required by the registrar, and perhaps also by the state board of health if that body does not have charge of state registration. The form used in Rhode Island for such a report is shown in Appendix 24. In New York returns are to be sent to the secretary of the state board of health promptly after record. The returns are to be sent to the state registrar monthly in New Jersey and Michigan, Copies of record are to be sent in quarterly in California, Connecticut, Delaware, Washington, and Wisconsin. In most states such reports are made annually.

The original returns or copies thereof or copies of record which are sent to the state registrar are usually to be preserved by him, and he is frequently required to bind and index them as in Michigan and New Jersey. This requirement appears to be due to a mistaken notion as to the functions of a state registrar. His duty should be to supervise registration and to arrange and publish statistical data obtained thereby. It is a well nigh useless expense to try and make the state collections of records useful as a storehouse of the facts of personal history. Individual records should be sought in the town and county records, not in the state records. It is much better to perfect the index of local records than to go to the expense of indexing those of the state.

Reports of Local Registrars.

The publication of vital statistics is most useful and necessary. Such publication can usually be best made by the state; but the registration of vital statistics in the United States began in the cities, attained greater perfection there, and continued for many years before it became general throughout the state. The cities were the leaders in this. They also published reports before it was done by the state. As

these reports date back earlier than state reports, and as the statistics are better in some cases, and the reports more extensive, it may be advisable to continue them for many years to come; but if the state treatment of this subject should ever become as perfect as it is hoped it may, it will become possible to do away with the publishing of local reports. The ordinances of Providence[1] require that

> "The city registrar shall cause an abstract of the returns of death made to him to be published in all the newspapers which contract to do the city printing, monthly, and oftener if required by the board of health. He shall also on or before the first day of April, annually, prepare and present to the city council a statement of the number of births, marriages and deaths which occurred in the city during the year ending with the thirty-first day of December next preceding, with such other information and suggestions in relation thereto as he may deem useful for the promotion of the public health, and other interests of the city."

A large majority of the cities and towns which publish annual health reports publish in them quite a full account of the deaths which have occurred during the year, and a few report births and marriages as well. Besides these a considerable number of cities publish monthly and some few weekly abstracts of births, marriages and deaths. This subject will be again considered in Chapter XIII.

Registration of Physicians and Others.

In order to secure the best control of the returns of births, marriages, and deaths it is necessary for the recording officer to have a knowledge of the names and addresses of all persons who are required to make such returns. At the present time nearly all the states have laws for the licensing of physicians, and some of them for the licensing of midwives. Many of these laws regulating the practice of medicine require the registration of the name and address of the physician or midwife with the local officer whose duty it is to record births, marriages, and deaths. Marriage laws sometimes provide that clergymen shall register their names and sometimes it is necessary for them to take out licenses. The state sometimes provides for the licensing of undertakers by the towns as in Rhode Island. In Pennsylvania a state board for the regulation of undertaking has been established. This board consists of five undertakers appointed by the governor. All persons engaged as undertakers may register with the board for a fee of ten dollars. In the future all persons desiring to become undertakers must be examined particularly as to their ability to care for bodies, dead of contagious disease, and may be licensed for twenty-five dollars. All licensed undertakers must register with the local board of health. No person can act as undertaker unless so licensed. There is a similar law in

[1] Providence, Ordinances (1900), Chapter 44, Sec. 8.

Maine, Nebraska, New York, South Dakota, and West Virginia, and in Iowa, Masachusetts, Minnesota, and New Hampshire the board of health is to license undertakers. Besides provisions in license laws requiring the registration of physicians, clergymen, undertakers, etc., the registration laws themselves also sometimes contain this requirement. Many cities also have local regulations requiring the registration of persons concerned in the reporting of births, marriages, and deaths.[1] Sextons are required to be registered in Connecticut, and in Cleveland, Memphis, Minneapolis, St. Louis, and Syracuse.

Fees.

A very considerable proportion of the recorders of vital statistics are paid for their services by means of fees. Whether or not this method of payment is desirable will not here be discussed. It is, however, a very common method of paying town and county clerks. In cities of considerable size it is not generally advised, and the recording and similar officers of such cities are frequently in receipt of salaries. In Massachusetts and Michigan the law provides that in cities of over 10,000 inhabitants a salary may be granted instead of fees for the recording of vital statistics. The following are some of the fees commonly paid:

For Collecting and Receiving Records.

In Connecticut and Massachusetts fifty cents is paid for collecting and recording data concerning each birth; as the fee for recording in these states is twenty cents, the fee for collecting must be thirty cents. In Maine and New Hampshire the fee for collecting is twenty-five cents. In Vermont and Wisconsin fifteen cents each is paid for collecting birth and death records, and in Rhode Island fifteen cents for births, and in Michigan ten cents. In Pennsylvania the fee paid the assessors for collecting records of births and deaths is fifteen cents, and in Kentucky it is two cents. In Connecticut ten cents is paid for inserting the name of the child in birth returns which are thus defective.

For Reporting Births, Deaths, and Marriages.

In Rhode Island undertakers are paid five cents for each certificate of death, and in Wisconsin physicians are paid twenty-five cents. In Delaware five cents is paid for each birth, marriage, and death reported. In Connecticut, Maine, Massachusetts, New York, Rhode Island, and Virginia, twenty-five cents, and in Vermont ten cents, for births. In

[1] Among these may be mentioned Brooklyn, Buffalo, Cleveland, Denver, the District of Columbia, Erie, Minneapolis, Omaha, the Pennsylvania cities of the second class, Philadelphia, Rochester, Wilmington.

New Hampshire twenty-five cents is paid for returns of births, marriages, and deaths. In New York and Rhode Island twenty-five cents is paid for returns of marriages. In Connecticut registrars receive five cents for receiving and certifying returns of deaths and births; in New Jersey, ten cents, and in Wisconsin, fifteen cents.

For Recording.

In Michigan twenty-five cents is the fee for receiving, recording and returning deaths, and the same amount is paid in Minnesota for the same service in regard to births and deaths. In Connecticut, Massachusetts, and Rhode Island twenty cents each is the fee for receiving, recording, indexing and returning records of births, marriages, and deaths, except that in Connecticut for sending returns to the state registrar each month the local registrar receives in addition two dollars, or if over two hundred names, two cents per name. In California, Maine, New Hampshire, and Vermont the fee for recording, indexing and returning is fifteen cents. In Delaware and West Virginia it is fifteen cents. In Pennsylvania the fee for recording is five cents, and in New Jersey cities three cents. In New Orleans fifty cents is charged the family for recording births and deaths, and one dollar for marriages.

For Searching Records.

In most states and cities the examination of records is free to the public, but sometimes a fee is prescribed for a search of the records by the officer in charge. In Pennsylvania this is ten cents; in Delaware, fifteen cents; in Brooklyn it is fifty cents for each year covered by the search, but in that city no charge is made for a copy of record, but twenty-five cents is required for certification.[1]

For Copy of Record.

Generally the fee fixed for a copy of record is for a certified copy. In New Jersey a copy of record is ten cents; in Sacramento, twenty-five cents, in Delaware, thirty cents; in Providence, forty cents; in New York, Pennsylvania, New Orleans (births and deaths), Wilmington, fifty cents; in Cleveland, Cincinnati, St. Louis, and New Orleans (marriages), one dollar; in San Francisco one dollar and one-half. In the District of Columbia, Louisville, and in San Francisco, for widows and children of soldiers no charge is made.

For Copies of Record Sent to Other Towns.

Such copies must be sent under the Massachusetts law, and the clerk receives therefor twenty-five cents for each return.

[1] These were the rules before consolidation with New York.

For Burial and Disinterment Permits.

Undertakers are sometimes required to pay for burial permits. In Connecticut and Vermont, Bradford and Reading, Pa., and Pawtucket, R. I., the fee is twenty-five cents. For disinterment permits the fee is twenty-five cents in Connecticut, New Orleans, and Reading; fifty cents in Philadelphia, and two dollars in California.

Penalties.

A penalty is usually imposed for the violation of registration laws. Not only are the physicians, midwives, undertakers, parents, clergymen, etc. liable for failure to send in the required returns, but the registrar is also liable if he neglects his duties.

The penalty varies from a minimun of five dollars in Colorado and Delaware to a maximum of one hundred dollars in Indiana, Maine, Michigan, and New Hampshire.

Disposal of the Dead.

Power to make rules and regulations concerning the disposal of the dead has been given to towns and cities by general statute in several states as in Massachusetts, Michigan, New Jersey, New York, Pennsylvania, and by special legislation to many cities, in the case of Philadelphia as early as 22 April, 1794.

Some of the above states and certain others, as Colorado and Illinois, vest the control of cemeteries in the hands of the local government, authorizing it to forbid the further use of cemeteries, and to prescribe regulations for new ones. Cemeteries are also very often owned or managed by corporations, church or otherwise, and are therefore subject to their charters, which frequently prescribe many details of their management. Many towns and cities own cemeteries, the ownership in many cases dating from the first settlement. Moreover the regulation of the disposal of human remains is so manifestly a matter which may effect the public health, that control of it by the local sanitary authority is assumed in any broad grant of powers. Most of the legislation in regard to cemeteries concerns the relations of the corporation to the lot or grave owners, the protection of the grounds, etc., and does not relate to sanitary matters, these being usually left to the local board of health. Usually a municipal cemetery is managed by a commission, but sometimes it is entirely in the hands of the board of health. Among important cities whose health department manages their municipal cemeteries may be mentioned Boston, Baltimore, New Orleans, and San Francisco.

The danger of the contamination of water supplies by cemeteries has been much discussed. The best information seems to be that the danger is very small: but the law given below has recently been passed in Pennsylvania.[1]

In Lowell it is required that a plan of drainage of cemeteries shall be filed with the board of health.

As the town and cities and local health authorities have such control and power over the disposal of the dead, most of the regulations in regard to these matters are found among local sanitary enactments, rather than in the state laws. Many regulations have to do with the care of bodies dead with contagious disease, but these will be considered in another chapter. Sometimes very general provisions are found requiring the sanitary disposition of bodies. The New York[2] rule is

"That no person shall retain, expose, or allow to be retained or exposed, the dead body of any human being to the peril or prejudice of the life or health of any person."

Carrying of Dead Bodies.

The removal of a body in any public carriage is sometimes forbidden as in Hartford[3] and Providence.

Time of Burial.

In order to prevent concealment of crimes or contagious disease, it is sometimes forbidden that burials shall take place during the night.[4]

The time during which bodies may remain unburied is frequently a subject of regulation. In Florida and New Orleans this is twenty-four hours in summer; and in Florida forty-eight, and in New Orleans thirty-six hours in winter. In the city of New York the limit is four days unless a permit stating the time the body may remain unburied is obtained from the health department. In Minnesota the time is four

[1] Chapter 151 of 1895:

"SECTION 1. Be it enacted, etc., That it shall be unlawful to use for the burial of the dead, any land, the drainage from which passes into any stream furnishing the whole or any portion of the water supply of any city, except beyond the distance of one mile from such city: Provided however, That the prohibitions of this act shall not be enforceable against any land now devoted to burial purposes in which there shall have heretofore been burials and sales of burial lots."

[2] City of New York, Sanitary Code (1899), Sec. 175.

[3] Hartford, Ordinances, Chapter XVIII.:

"SEC. 15. No hack or public carriage, owned or kept for hire, shall be used for transporting the body of any person who shall have died of disease.

[4] Boston, Ordinances, Chapter 49:

"SEC. 20. No person shall bury a dead body, or cause one to be buried, at any other time than between sunrise and sunset, except in accordance with a permit from the Board of Health."

days. In Buffalo the time for which a permit may be given is six days, and without special permission a body may remain unburied not over three days. The time in deaths from contagious disease is often made less than this, frequently twenty-four hours. Besides regulations such as the above, the health officer sometimes has power to order burial.[1]

The two sections following the one given below provide for the service of the orders and instruct the police to report to the health commissioner when bodies are kept too long without burial, and to assist in enforcing the commissioner's orders in regard to the same. In the City of New York the board of health may peremptorily order the burial of bodies even in coroners' cases. The storing of dead bodies except for "freezing or embalming" is forbidden in Memphis.

Embalming.

In order to prevent the concealment of criminal poisoning the following has been enacted in Buffalo:[2]

"SEC. 71. No person shall embalm any dead body without a written certificate from the attending physician that there are no facts attending the illness and death of the person that would preclude such embalming from a medico-legal standpoint. Provisions of this ordinance shall not apply to cases of death from injury or accident.

"SEC. 72. No person, company, or corporation shall embalm the body of a deceased person unless he or it shall have first conformed to the rules and regulations prescribed by the coroner, and procured a permit from the health commissioner, nor shall such permit be granted until all the rules and regulations of the department of health or the commissioner have been complied with."

Burials only in Cemetery.

Burial elsewhere than in a cemetery is forbidden in Charleston, Cincinnati, New Orleans, Newport, Providence, Reading, St. Louis, and other cities. In St. Louis and Newport the health officer is directed to disinter all bodies buried contrary to this rule.

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[1] St. Louis, Ordinances (1893), Chapter XIV.:

"SEC. 306. **Interment, when ordered to be made.**— Whenever the interment of the body of any deceased person in the limits of the city of St. Louis has in the opinion of the health commissioner been unnecessarily delayed, or where for sanitary reasons the interment of the body as aforesaid should take place forthwith, or where in the opinion of the said health commissioner such delay may be injurious to the public health, or endanger the lives of the citizens of this city, it shall be his duty to issue an order directing that said body shall be interred forthwith. Said order shall be directed to the relatives, friends, person or persons having in charge the body of such deceased person. If the relatives, friends, person or persons, as aforesaid, fail or refuse to obey said order, then and in that case the health commissioner shall have the power to remove such body, and it shall be his duty to cause the body to be immediately interred in the public cemetery."

Buffalo, Ordinances (1897), Chapter XXV.

Depth of Grave.

This is very commonly regulated. It must be three feet deep in New Orleans, five feet in Fitchburg, six feet deep or four below the level of the street in the City of New York, Buffalo, and Memphis; six feet in Philadelphia, St. Louis, and Yonkers; and eight in the built up portion of Philadelphia. The top of the coffin must be three feet below the surface in Boston, Cambridge, and Newport; three and one-half in New Jersey, if the coffin is four feet long or less; four in Bridgeport and in New Jersey, if the coffin is over four feet long; and five in Atlanta. In New Orleans graves must never be less than two feet apart.

Only One Body in a Grave.

In Atlanta, Buffalo, and Charleston it is forbidden to place more than one body in a grave. In Lowell only two bodies may be in one grave, and in other cities only one body may be placed in a grave except that a child may be buried with a parent.

Grave to be Immediately Filled.

According to the New Jersey statute, and the rules of the Lowell board of health, a grave must be immediately filled when the body is placed in it.

Vaults and Their Use.

Instead of burial in graves, deposit in a vault or tomb is sometimes the method employed for disposing of bodies. This is not considered desirable, and from its expense and perhaps other reasons, is not very common. Sometimes the construction and use of such vaults is forbidden as in Charleston and Philadelphia.[1]

In other cities permits are required for the construction of vaults. In Yonkers a permit is required for the use of a vault. The method of construction of vaults is often regulated and sometimes, as in Buffalo, the plans must be approved.

Receiving Vaults.

Most cemeteries have a common receiving vault in which bodies may temporarily remain awaiting burial or transportation. Often the length

[1] Philadelphia, Rules of Board of Health (1895), Sec. 205e:

"The placing of a dead body in any unsealed overground vault, catacomb or other receptacle above ground or in underground vaults, except such as are fitted with a stone covering to be tightly cemented after each interment, is strictly prohibited, unless the coffin or casket, containing the remains, shall be first permanently and hermetically sealed in a metal case. This rule does not apply to receiving vaults."

of time a body may remain in the vault is limited. Thus in New Jersey a body cannot remain in a vault over forty-eight hours between the first of May and the first of November, unless the vault is below ground, or the body is in an air tight casket. In Buffalo[1] and some other cities it is seventy-two hours during the same season. In Cincinnati[2] a body may remain in a vault for five days. In Newport, R. I.,[3] a body may remain in a vault for ten days only, without a permit, and must be in a strong, tight box ready for removal.

Inspection and Disinfection of Vaults.

In a number of cities it is prescribed that vaults shall be inspected and cleansed from time to time. In Buffalo they are to be emptied and cleansed on the first of May of each year. The Newport, R. I., rule is given below.[4]

Disinterments.

Permits are required for the disinterment of bodies by the laws of California, Connecticut, Iowa, Ohio, Maine, New Hampshire (for cities), New Jersey, and in Atlanta, Augusta, Boston, Buffalo, Cambridge, Charleston, Lowell, Memphis, Milwaukee, Minneapolis, New Orleans, and Wilmington. It is sometimes required, as in Ohio, that the application must be made by the next of kin and must be sworn to. In Wisconsin the permit must be approved by the state board of health. Forms for such application and for permits are shown in Appendix 25.

In San Francisco[5] it is required

"That the Inspector of Vaults and Disinterments be instructed to see that disinterments and removals of human remains from the cemeteries shall be conducted so as not to be offensive to the senses, or injurious to public health."

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[1] Buffalo, Ordinances (1897), Chapter 25, Sec. 46.

[2] Cincinnati, Manual of Health Department (1898), Sec. 100.

[3] Newport, Ordinances (1892), Chapter 23, Sec. 12.

[4] Newport, Ordinances (1892), Chapter 23, Sec. 11:

"Every vault or tomb, built wholly or partially above the surface of the ground and used or designed for the reception of dead bodies in any cemetery or other place in said city, shall be examined and shall be opened by the proprietor thereof, or by the person or persons in charge thereof, for examination by the mayor or the inspector of nuisances, or any member of the board of health of said city, or any person designated by said board whenever and as often as either of the above named city officers or any person designated by said board as aforesaid, shall desire or request the same, and shall be thoroughly cleansed and purified by such proprietor, or person or persons in charge thereof, under the direction of said inspector of nuisances, or of a person designated by said board as aforesaid, as often as such inspector, or such last named person shall require the same to be done, not exceeding four times in any one year.

[5] San Francisco, Rules of the Board of Health, 31 Dec. 1884.

In Philadelphia permits for removal from grave to grave or cemetery to cemetery in the city may be given by the clerk, but all other disinterment permits must be given by the board. In Pennsylvania disinterments must not take place between sunset and sunrise. In Philadelphia permits must be used within seventy-two hours after they are issued. In Ohio disinterments cannot be made between April 1st and October 1st. The Wilmington rules require that a disinterment shall not be made within six months after death, and in California a body cannot be disinterred for a year without consent of the mayor and council. In Ohio the disinterment of contagious disease is forbidden, and in New Jersey it can only be disinterred when in a metallic coffin. In Buffalo such a body cannot be disinterred for ten years after burial. In San Francisco there are two disinterment inspectors who supervise all disinterments and collect the fees.

Cremation has received statutory recognition in several states, as Connecticut, Massachusetts, Minnesota, and Pennsylvania. In Massachusetts no body shall be cremated within forty-eight hours after death, except in cases of contagious disease, and not until it has been viewed by the medical examiner and his certificate been given that judicial inquiry is not necessary. A somewhat similar law is found in Connecticut. In Pennsylvania where burial permits are not required, it is neccessary that, prior to cremation, a permit shall be obtained from the health authorities of the locality where the crematory is situated. In St. Louis[1] a written application must be made by the friends of the deceased and may be refused by the health commissioner if he is not satisfied that it is proper to cremate the body. In Minnesota a body may be cremated on request of friends. In San Francisco[2] it is forbidden to construct a crematory within three hundred feet of a street or park, and a crematory must be operated so as not to be detrimental to public health and decency. In Connecticut plans of the crematory must be approved by the state board of health. In Buffalo[3] a coffin used to convey a body to a crematory must not be used again.

The use of bodies for dissection is permitted and regulated by the laws of several states.

The regulation found in Cincinnati, which forbids the placing in the streets of ice which has been used upon dead bodies, is in the line of decency, but it hardly seems that such a regulation ought to be necessary.

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[1] St. Louis, Ordinances (1892), Sec. 309.

[2] San Francisco, Rule of Board of Health, March 21, 1894.

[3] Buffalo, Ordinances (1897), Chapter 25, Sec. 53.

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MISSOURI. Marriage, Revised Statutes (1899), Secs. 4315–22.
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CHAPTER III.

NUISANCES.

IT is the popular idea that the chief function of the board of health is the abatement of nuisances; and it must indeed be admitted that a large part of the time and energy of sanitary officers is taken up in the performance of this duty. A nuisance has been variously defined by statute and by legal writers, but in general it may be said to be anything which is a violation of the maxim, "*sic utere tuo ut alienum non laedas.*" It is the use of one's own property in such a way as to injure the rights of another and to inflict damage.

The following is a recent statutory definition: [1]

"Whatever is dangerous to human life or health, and whatever renders soil, air, water, or food impure or unwholesome, are declared to be nuisances, and every person, either owner, agent, or occupant, having aided in creating or contributing to the same, or who may suffer to continue or retain any of them shall be deemed guilty of a misdemeanor."

Nuisances therefore may be of very many kinds, and it is not with all nuisances that boards of health usually have to do. Nuisances which more or less directly affect health, and particularly nuisances which consist of foul, offensive or otherwise dangerous odors or gases, or which are in any way due to decaying matter, or to impurities of any kind in the air, are the kind, the control of which is usually placed under the jurisdiction of the sanitary authority. But long before boards of health were established the control of nuisances was provided for. As early as 1692 the colony of Massachusetts Bay gave the selectmen of certain towns authority to regulate offensive trades. From that time nuisance legislation was frequently resorted to in that and other colonies and in the states; and towns were during the last century and before there was any regularly constituted sanitary authority invested with as broad, and ample powers in regard to nuisances as they now possess. But with the development of interest in sanitary affairs, towards the middle of the present century, a more strict and general application of these laws was felt to be needed. The dangers as well as the discomforts of filth were urged, doubtless extravagantly so, by physicians and others. The newly established boards of health were therefore generally invested

[1] Utah, Chapter 45 of 1899, Sec. 1.

with the control of nuisances which before had been exercised by the selectmen of towns or the legislative department of cities. It is the general opinion that these matters will be better looked after by the health department than by any other, and we cannot expect this part of the work of the board of health to become any less in the future. Our civilization ever demands greater cleanliness and greater freedom from nuisances both private and public; and this is particularly true in municipalities, and the necessity for greater care on the part of the individual lest he permit or cause a nuisance increases with the density of the population. Hence the public demands more than ever before that the municipality shall restrain such individual acts as endanger the health and comfort of those affected thereby. Even if it shall in the future be shown that filth is not as directly dangerous to health as it has been believed to be, there is little probability that any community will cease to protect its members from the very great discomfort which comes from nuisances due to that cause.

It is not necessary then to take up the consideration of what a nuisance is, or discuss the difference between a private and public nuisance or the redress which an individual has either by abatement or by an action for damages. Nor is it the place to consider the suppression of nuisances by injunction. Our subject is the statuory powers possessed by the local health department and the methods which it commonly employs.

There are two ways in which the government commonly attempts to deal with nuisances. One is by their abatement, the other is by endeavoring to prevent their creation by means of appropriate legislative prohibitions. The abatement of nuisances is rarely accomplished through the agency of state sanitary authority, but is usually left to the local government. But the authority which the local sanitary power possesses in this field is generally conferred very explicitely by statute law. Usually these state laws prescribe quite minutely the methods to be employed in thus dealing with nuisances; but sometimes, particularly in special charters, the power to abate nuisances is conferred in concise and general terms, as it is in Chicago, Baltimore, Omaha, and Providence. Of the two methods of dealing with nuisances, by abatement and by prohibition, the former will be first considered.

I. Abatement of Nuisances.

The first general state law that specifically provided for the manner in which the local government should order the abatement of nuisances and secure compliance with its order was that enacted in Massachusetts in 1797. That law has remained practically unchanged upon the

orders. In Massachusetts the board of health or health officer may issue the order, and in Rhode Island the health officer may do so "when the council cannot be conveniently convened." In Cleveland the health officer issues the orders. In some cities the sanitary inspectors or similar officers have delegated to them the power to issue nuisance orders. This is so in Atlanta, Augusta, and the District of Columbia.

When a board of health or its agents are given authority over nuisances, it is generally assumed that power to enter upon private premises for purposes of inspection is included. This may the more reasonably be assumed when the board as is often the case is directed to "examine into nuisances"; but power to enter private premises is specifically given in many statutes relating to this subject.[1]

Sometimes, as in Connecticut, it is simply provided that the "health officer may enter all places when such board shall have just cause to suspect any such nuisances or causes of filth to exist." In West Virginia such inspection may be made "except in the night time." The Detroit law is as follows:[2]

"Also to enter upon or within any place or premises, where conditions dangerous to the public health are known or believed to exist, and by appointed members or persons to inspect and examine the same for the protection of life and health and for no other purposes; and all owners, agents, and occupants shall permit and facilitate such sanitary examinations, and it shall be the duty of said board of health to furnish such owners or occupants a written statement of results or conclusions of such examination"—"The members of said board, the health officer, or any of the sanitary inspectors, and such other officer or person, as may at any time be by said board authorized, may, without fee or hindrance, enter, examine or survey all grounds, erections, vehicles, structures, apartments, buildings, and places in said city, including vessels of all kinds in the water, and all cellars, sewers, passages and excavations of every sort, and inspect the safety and sanitary condition and make plans, drawings, and descriptions thereof, according to the order and regulation of said board. Said board may make and publish a report of the sanitary condition, and the result of the inspection of any place, matter or thing in said city, so inspected, or otherwise as aforesaid, so far as, in the opinion of said board, such publication may be useful."

A considerable number of cities which have no such specific statutory provision in their charters, nevertheless by virtue of their general legislative powers in regard to sanitation have included such provisions in their ordinances or the rules of their health department.[3]

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[1] Among such statutes are those of Alabama, Colorado, Connecticut, Delaware, Iowa, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, Pennsylvania, South Carolina, Utah, Virginia, West Virginia, and Wisconsin. Such power is granted in the special legislation of several cities, as Detroit, Pennsylvania cities of the second class, and the City of New York.

[2] Michigan, Chapter 10 of 1895, Sec. 7.

[3] Among these are Albany, Atlanta, Bridgeport, Charleston, Chicago, Cleveland, Denver, Jersey City, Memphis, Mobile, Newark, Newport, New York, Omaha, Rochester, St. Louis, Utica, and Yonkers.

In many of these ordinances it is also provided that no one shall obstruct the officers in their inspections.

Occasionally health officials have been annoyed by unauthorized persons representing themselves as inspectors and thus gaining access to private premises for various illegitimate purposes. This is sometimes forbidden by law as by a recent enactment of Congress for the District of Columbia.[1]

A number of the state laws make provision for the inspection of private premises only when in the ordinary course of work such entry is refused. Most of these laws follow the Massachusetts statute which was first enacted in 1816. It is given below.[2]

Most of the modifications of this law provide for the different officials, who in the various states shall issue the warrants and make the inspections; and occasionally the limitation as to "reasonable time" is made specific by the words, "between sunrise and sunset."

Most of the legislation concerning nuisances provides specifically for the issuing of orders to the parties interested before the nuisance is abated. It is claimed that this is not necessary, and the Alabama and Virginia statutes do not seem to contemplate it, nor does the ordinance in Bridgeport prescribe it; and in some cities it is specified that under certain conditions a nuisance may be abated without the service of any order. It may be done in San Francisco when the nuisance is on the property of the city or of a non-resident; in New Haven and Omaha,

[1] "*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That it shall be unlawful for any person in the District of Columbia to falsely represent himself or herself as being an inspector of the health department of said District, or an inspector of any department of the District government; and any person so offending shall be deemed guilty of a misdemeanor, and on conviction in the police court of said District shall be punished by a fine of not less than ten dollars nor more than fifty dollars for the first offense, and for each subsequent offense by a fine of not less than fifty dollars nor more than one hundred dollars, or imprisonment in the jail of the District not exceeding six months, or both, in the discretion of the court.

"Approved, March 2, 1897."

[2] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 27:

"When the board thinks it necessary for the preservation of the lives or health of the inhabitants to enter any land, building, or premises, or vessel within its town, for the purpose of examining into and destroying, removing or preventing a nuisance, source of filth, or cause of sickness, and the board or any agent thereof sent for that purpose is refused such entry, any member of the board or such agent may make complaint under oath to any justice of any court of record or to two justices of the peace of the county, stating the facts of the case so far as he has knowledge thereof; and said justice or justices may thereupon issue a warrant, directed to the sheriff or any of the deputies, to such agent of the board, or to any constable of such town, commanding him to take sufficient aid, and at any reasonable time repair to the place where such nuisance, source of filth, or cause of sickness complained of may be, and to destroy, remove, or prevent the same, under the direction of the board."

when the owner is unknown; in Minneapolis, when he cannot be found; in Pennsylvania cities of the second class and in Milwaukee, when the owners of unoccupied property live out of the city or cannot be found. In St. Louis if the owner cannot be found, and the statement by the officer on the return is conclusive of this, the order must be advertised two days in the newspaper doing the city printing. In Cleveland the health officer may "in case of necessity" "abate a nuisance without notice."

The ordinances of Denver provide:[1]

"Non-residents owning property on which a nuisance exists, and who have been notified thereof and given sufficient time to appear before the health commissioner in reference thereto, and who fail or refuse to appear or to have the nuisance remedied as directed, shall be given ten days' notice by publication, and upon continued refusal or omission to comply, the premises may be placarded by the health commissioner and declared a nuisance prejudicial to the public health or unfit for human habitation."

Usually it is provided that an order to abate a nuisance shall be directed to the owner or occupant of the property on which the nuisance is found. This was the form of the Massachusetts law, and it has been retained in those states which have copied Massachusetts, and it appears in the general nuisance laws of many other states and in most city charters. Sometimes, as in North Carolina, the occupant is put first and the owner is only notified when the premises are unoccupied. In cities of the second class in Pennsylvania the term tenant is used, and in Hartford occupant or tenant. Several laws specify still further the parties to be notified. In Delaware it is "the person to whom it belongs or in whose possession, or on whose property it is, or the person causing the nuisance." In Florida, "the person committing, creating, maintaining or keeping" the nuisance. In Ohio the nuisance may be ordered abated by "the owner, agent, or other person or persons having control of the same, or being responsible for the condition." In the District of Columbia the order is to the person "permitting, creating, or keeping the nuisance"; in Wilmington, Del., to "the owner, agent, occupant, or other person causing" the same. The following is the law in the City of New York:[2]

"Service of any order of said board of health shall be deemed sufficient if made upon a principal person interested in or upon a principal officer charged with duty in respect of the business, property, matter, or thing, or the nuisance or abuse to which said order relates; or upon a person, officer or department, or one of the department who may be most interested in or affected by its execution. If said order relate to any building, or the drainage, sewerage, cleaning, purification, or ventilation thereof, or of any lot or ground on or in which such building stands, used for, or intended to be rented as, the residence or lodging place of several per-

[1] Denver, Ordinance 44 of 1893, Sec. 156.

[2] New York, Chapter 378 of 1897, Sec. 1224.

sons, or as a tenement house or lodging house, service of such order on the agent of any person or persons for the renting of such building, lot or ground, or for the collecting of the rent thereof, or of the party thereof to which said order may relate, shall be of the same effect and validity as due service made upon the principal of such agents and upon the owners, lessees, tenants, occupants of such buildings or parts thereof, or of the subject matter to which such order relates."

In Minnesota the order may be served on the agent. The Denver ordinances[1] prescribe that

"Whenever the owner or owners of any property are not present in Denver, or when any estate is held in trust for minor heirs, the person receiving the rents of the same may be held responsible for the execution of any orders made by the health commissioner for the sanitary improvement of the property."

Usually no provision is made for a preliminary hearing, though it is sometimes urged that such should be granted. In Denver, however, it is required that a hearing shall be given after a two days' notice, and in the City of New York and in Detroit a hearing must be given if requested. In Ohio and Georgia a hearing must be held before a nuisance is abated by the board of health. The following is the Ohio law:[2]

"In all cases where the order of the board of health is neglected or disregarded, in whole or in part, the board may elect to cause the arrest and prosecution of the person or persons offending as hereinafter provided, or may elect to do and perform, by its officers and employes, what the offending party should have done. If the latter course is chosen, before the execution of the order of the board is begun, it shall cause a citation to issue, and be served upon the person or persons responsible, if residing within the jurisdiction of the board; but if not, shall cause it to be mailed by registered letter to such person, if the address is known or can be found by ordinary diligence; and if the address cannot be found by ordinary diligence, shall cause the citation to be left upon the premises, in charge of any person residing thereon. The citation shall briefly recite the cause of complaint and require the owner or other person or persons responsible to appear before the board of health at a time or place stated, or as soon thereafter as a hearing can be had, and show cause, if any, why the board shall not proceed and furnish the material and labor necessary to, and remove the cause of complaint."

Doubtless it is uncommon for health officials except in urgent cases to proceed immediately to inflict the penalty as soon as the time specified in the order has elapsed. When good cause is shown further action is often delayed in the matter, at the option of the executive officer. Occasionally provision is made for such an extension of time. Thus in Hartford,[3]

"If the party served with an order by the board of health before the execution of the order is commenced, apply to the board to have its order or its execution stayed or modified, it shall be the duty of the board to temporarily suspend or modify it, and give the party, as the case may require, a reasonable and fair opportunity to be heard and to present proofs and facts against the execution of the order, or in favor of its modification."

[1] Denver, Ordinance 44 of 1893, Sec. 138.

[2] Ohio, Annotated Statutes (1900), Sec. 2129.

Hartford, Ordinance of 26 January, 1885, Sec. 6:

Often no directions are given in regard to the service of the order, and sometimes the matter of the service of these and other orders and notices is covered by other statutes. Frequently, however, provision is made for the service. The following is the section of the Massachusetts statute relating to this:[1]

"Such order shall be made in writing, and served by any person competent to serve a notice in a civil suit, personally on the owner, occupant, or his authorized agent; or a copy of the order may be left at the last and usual place of abode of the owner, occupant, or agent, if he is known and within the state. But if the premises are unoccupied and the residence of the owner or agent is unknown or without the state, the notice may be served by posting the same on the premises and advertising in one or more public newspapers in such manner and for such length of time as the board or health officer may direct."

Posting on the premises without advertising is provided for in the New York and New Jersey law. In Cleveland when after "due search, neither owner or occupant can be found, or are non-residents," the notice may be posted on the front door, or wall, or fence, and an advertisement inserted for one week in the daily newspapers of the city, and the cost of advertising can be collected with the cost of abating the nuisance. The fact that the owner is often so difficult to reach, and that in point of fact it is the agent that is sometimes the one most responsible for the nuisance, has led to the service of the notice upon him, he being supposed to be in communication with the owner and responsible to him. This service is permitted by the Massachusetts and Rhode Island law, and in the City of New York. The New Jersey statute provides for a dual service, one notice upon the "owner or owners" and "a duplicate of the notice so given shall be left with one or more of the tenants or occupants." In New Hampshire the notice may be left at the abode of the owner. In some cities, as Chicago[2] and Denver,[3] the abatement of a nuisance is facilitated by a requirement that the agent of the property shall disclose the name of the owner when required by the health officer to do so.

Many of the laws refer to the time which shall be given the parties maintaining a nuisance to abate the same. In several states the time specified in the statute to be allowed for the abatement of the nuisance is twenty-four hours. This is the law in Colorado, Minnesota, North Carolina, Vermont, and Wisconsin. In the District of Columbia, Florida, Iowa, Massachusetts, and Rhode Island the time is twenty-four hours "or such other reasonable time" as may be directed. In Con-

[1] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 22.

[2] Chicago, Municipal Code (1881), Sec. 1577.

[3] Denver, Ordinance 44 of 1893, Sec. 85.

necticut and Delaware, and in Philadelphia, the time given shall be that directed by the health officer or the board of health. In Denver it is such time as may seem "reasonable to the health officer." In Providence most of the orders give seven days for abatement. In the City of New York and Detroit "it is five days, or less if so stated in time of pestilence." In Buffalo the time is five days, in San Francisco and Jersey City three days, in Atlanta six hours.

By Chapter 143, Georgia Laws of 1895, it is provided that in counties in which there is a city of over 60,000 inhabitants an order to bury offensive animal or vegetable matter must be complied with in three hours. In Wyoming the time given to abate a nuisance is by statute twenty-four hours, and a continuance of neglect is considered an additional offence for each twenty-four hours of continuance.

In Boston, although permitted by statute to fix "a reasonable time," the board of health on account of the difficulty in proving what is reasonable always fixes the time in the order as twenty-four hours, for the law reads "twenty-four hours or such other time as it deems reasonable"; but after the service of the orders, what seems to the board as a reasonable time, is always given before further action is taken. It is probable that sanitary authorities very rarely take advantage of the short interval permitted by the statutes. As a rule much more than twenty-four hours is given, usually several days, and often the time is further extended at the instance of the parties to whom the orders are issued. Undue haste in the abatement of nuisances is not a characteristic of sanitary officials. It does not take many days in a health office to learn that those injured by the nuisance feel that the proceedings are far too slow.

After the time specified in the order has elapsed two modes of action are usually open to the officials. A criminal action may be brought against the parties who have failed to obey the order and they may be fined, or the nuisance may be summarily abated. It is also possible that both of these courses may be pursued.

The penalty provided for failure to comply with orders to abate nuisances of course varies considerably in different states. Usually it is a fine, though occasionally imprisonment is an alternative. In Detroit the person violating an order of the board of health may be imprisoned not to exceed six months. In Ohio if a person fails to obey an order he is subject to a fine of one hundred dollars or imprisonment for ninety days, but shall not be imprisoned for the first offence. In the case of a corporation the fine may be three hundred dollars and "any officer of the corporation having authority in the matter and permitting the violation shall be subject to a fine or imprisonment, or

both."[1] The procedure in such cases is given below.[2] In Delaware delinquents are to be fined or to be sent to jail until the fine is paid. The average fine is perhaps not to exceed fifty dollars. The smallest is in North Carolina where the fine is one dollar for each day of neglect. In St. Louis it is not to exceed five hundred dollars, and in Detroit not to exceed one thousand dollars. In several states as Iowa, Massachusetts, North Carolina and Rhode Island, the law provides that the fine may be imposed for each day during which neglect of the order continues. As in most cases the order to abate a nuisance is to be served on the "owner or occupant," so in most cases it is on the owner or occupant that the fine is to be imposed. When the notice is served on the occupant alone as in North Carolina, it is the latter that is to suffer the penalty. In Detroit it is "every person who shall wilfully violate or refuse to obey" the order; and in Ohio the board of health may cause the arrest or prosecution of "the person or persons offending."

After the service of an order and the expiration of the time specified therein the board of health or its agents may abate the nuisance. In Ohio before the nuisance can be abated the owner must be cited to appear as is shown by the law quoted on page 115. In St. Louis the health commissioner is to abate the nuisance if after the specified time it is not done, "or if the owner fails to show good cause why he cannot or ought not to comply."

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[1] Ohio, Annotated Statutes (1900), Secs. 2137-8.

[2] Ohio, Annotated Statutes (1900):

"SEC. 2139. Prosecutions under this chapter and the civil action provided for in the preceding section shall be instituted before any justice of the peace within the county, or justice of the peace, mayor, or police judge of the city or village where the offense was committed, or the offending person resides. If imprisonment is, or may be a primary penalty, the court shall, after plea of not guilty, unless a trial by jury is waived, issue a venire to any constable of the county, containing the names of sixteen electors residing within the county, to serve as jurors to try such cause. Each party shall be entitled to two peremptory challenges, and challenges for cause as in other cases, as in criminal cases in the court of common pleas. If the sixteen names be exhausted without obtaining a panel of twelve, the court may direct the constable to summon any of the bystanders, to fill the panel to twelve, or on demand, shall issue other venires for four electors at a time until the panel of twelve is full. In prosecutions under this chapter, no deposit for costs shall be required; and a judgment or verdict of guilty shall be immediately followed by sentence and execution thereof, unless suspended pending the preparation and allowance of a bill of exceptions; and all fines collected under this chapter shall be paid to the treasurer of the municipality or township and credited to the sanitary fund of the board of health instituting the prosecution. No fine imposed in any prosecution under this section shall be remitted by the magistrate before whom the complaint is made."

The following is an important section of the New Jersey law:[1]

"*And be it enacted*, That no injunction shall issue out of any of the courts of this state, to stay, stop or enjoin proceedings, or to prevent any local board of health from proceeding with the removal of any alleged nuisance, source of foulness or cause of sickness, hazardous to the public health, until such board has been duly notified to appear and be present at the hearing of such application, and has an opportunity to be heard thereon."

In almost all cases the law in regard to abating nuisances is permissive, "the board of health *may* cause the nuisance to be abated"; but sometimes, as in Connecticut, Florida, and New Jersey, and some other cities, it is mandatory, the "board of health *shall* cause the nuisance to be abated." Occasionally more specific directions are given as to who shall abate the nuisance. In Pennsylvania boroughs the order "shall be executed by the health officer, his subordinates and workmen." In Detroit it is the board of health, "its officers and employees," who may lawfully enter upon any premises and suppress or remove the nuisance. In Bridgeport "the board of health or either of the members thereof or any person under their direction may at any time abate or remove nuisances." In Alabama "the mayor or intendant, or a justice of the peace of the county in which such lot, house or vessel is, may issue his warrant, directed to the sheriff, marshal, constable, or other lawful officer, requiring him to enter such house, lot or vessel, and under the direction of such health officer, to remove such infected person, or to remove or destroy the source of infection or disease." The Virginia law is very like that in Georgia, and it is the sheriff or deputy sheriff of the county who is to abate. In Buffalo the department of public works is to abate nuisances.

Usually it is intended that the costs of abating a nuisance shall be paid by the owners of the property on which it is found; but sometimes no such provision is found in the law. It is not in Delaware. In North Carolina the health officer can only abate a nuisance when the owner pleads poverty, as is shown below.[2]

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[1] New Jersey, General Statutes (1895), p. 1638, Sec. 15.

[2] North Carolina, Act of 1 March, 1893, Sec. 22:

"Whenever and wherever a nuisance upon premises shall exist which in the opinion of the county superintendent of health is dangerous to the public health, it shall be his duty to notify in writing the parties occupying the premises (or the owner, if the premises are not occupied) of its existence, its character and the means of abating it. Upon this notification the parties shall proceed to abate the nuisance, but failing to do this shall be adjudged guilty of misdemeanor and shall pay a fine of one dollar a day dating from twenty-four hours after the notification has been served, the amounts so collected to be turned over to the county treasurer: Provided, however, that if the party notified shall make oath or affirmation before a justice of the peace of his or her inability to carry out the directions of the superintendent,

In Florida and Detroit the cost of summarily abating a nuisance by the sanitary authority is to be paid by the "person or persons committing, creating, keeping or maintaining such nuisance." In Massachusetts and Iowa the owner or occupant must be "actually notified." In Massachusetts the costs are to be paid by the "owner or occupant or other person who caused or permitted the same," and a similar provision is found in other states. In New Hampshire, too, to the costs are to be added the fees of the health officer. In Bridgeport it is from the person permitting the nuisance that the cost is to be collected: in the Pennsylvania cities of the second class, from the person offending: in Minneapolis from those "who created and suffered such nuisance." In Detroit the cost is a "charge upon the occupant or upon any or all of the occupants": but it is further provided

"In case the common council upon the certificate of said board as to the amount of the expense aforesaid and the purposes for which the same were incurred may cause an assessment to be levied upon said premises and the owner or owners thereof and the same to be collected in the same manner and by the same proceedings as special assessments are levied and collected for the construction of sidewalks in said city. In case such expense is paid by any occupant or lessee of such premises he may recover from any other person having an interest in such premises such proportion of the said expense as the court adjudges should justly and equitably be borne by such defendant, and he may deduct and retain from any rent payable to such defendant the amount so recoverable as an offset thereto."

A somewhat similar provision is found in the charter of New York,[2] where

"The charge of abating a nuisance shall be against each of the owners or part owners and each of the lessees and occupants of the building, business, place, property, matter, or thing to which said order relates, and in respect of which said expenses were incurred."

In Indiana the cost of abating the nuisance and ten per cent. additional is to be collected. In Mobile if the owner refuses to pay within three days the cost of abating the nuisance he is to be fined fifty dollars.

Special provision is made in many statutes for the manner in which the cost of abating a nuisance is to be collected. In Massachusetts the expense incurred in abating a nuisance dangerous to the health is to be recovered from an individual or a corporation by an action of con-

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it shall be done at the expense of the town, city, or county in which the offender lives. In the latter case the limit of the expense chargeable to the city, town, or county, shall not be more than one hundred dollars in any case: Provided, further, that nothing in this section shall be construed to give the superintendent the power to destroy or injure property without a due process of law as now exists for the abatement of nuisances."

[1] Michigan, Chapter 19 of 1885, Sec. 19.

[2] New York, Chapter 378 of 1897, Sec. 1276.

tract, in Iowa by civil action, in Rhode Island by an action of the case, in many states like debts or by action of debt. In Albany the action may be brought "against the owner or any one or more of the owners."

In Ohio[1] the board of health after abating a nuisance is to

"Certify the cost and expense to the auditor of the county, and if the material and labor are itemized, and the statement is accompanied by the certificate of the president of the board, attested by the clerk, reciting the order of the board, and that the amount is correct, the auditor shall have no discretion, but shall place the sum against the property upon which the material and labor were expended, which shall, from the date of entry, be a lien upon the property, and be paid as other taxes are paid."

In St. Louis the president of the board of public improvements shall ascertain the cost like street improvements, and special tax bills are rendered against the property. In Detroit the costs are collected like sidewalk assessments. In Colorado, Milwaukee, and New Haven also the costs are to be assessed like taxes, but in the two cities the abatement of nuisances must be done with funds set apart for the purpose. The charter of the City of New York provides in an elaborate and explicit manner for the collection of the costs of abating nuisances.[2] In Philadelphia,[3]

"The expenses attending the removal of any nuisance shall be and remain a lien upon the premises from which such nuisance has been removed, and it shall be the duty of the said board of health to file the claim therefor against the owner or reputed owner, in the office of the clerk of the district court for the city and county of Philadelphia, which said court shall, in all cases, have jurisdiction of the same, and the said claims may be filed, recorded and proceeded on by *scire facias* to recover the same, in like manner as mechanics' liens are recoverable, upon the trial of which, the fact of the nuisance shall not be inquired into, and the defendant or defendants shall only be permitted to give evidence of payment, or that unnecessary expenses were incurred by the board in the removal of the nuisance."

In some states, besides the provision made for the abatement of nuisances by the board of health or other branches of the local government, the statutes direct that the courts may after conviction for the maintenance of a nuisance order the nuisance abated at the cost of those maintaining it. Such provisions are found in the laws of Colorado, Illinois, Iowa, Michigan, Mississippi, Tennessee, and Washington.

In Detroit the statute provides for the prevention of a threatened nuisance by injunction by any court of equity having jurisdiction and furthermore requires the law department of the city to bring suit for this purpose when requested by the board of health.[4] This method of

[1] Ohio, Annotated Statutes (1900), Sec. 2130.

[2] New York, Chapter 378 of 1897, Secs. 1275–1281.

[3] Pennsylvania, Brightly's Purdon's Digest (1895), p. 1433, Act of 7 April, 1830, Sec. 2.

[4] Michigan, Chapter 10 of 1895, Sec. 29.

asking for an injunction to abate a nuisance is provided for in the New Jersey statutes,[1] and is sometimes adopted by local boards of health.[2]

In Mississippi[3] the state board of health when informed by a county health officer may declare a nuisance anything calculated to cause or aggravate contagious or epidemic disease. The board shall notify the district attorney who shall bring the case before the court and a jury trial shall be granted if asked. From the decision there can be no appeal and the nuisance shall be abated. As is shown above, the statute provides that in Philadelphia the decision of the board as to a nuisance cannot be inquired into and in Massachusetts the adjudication that a nuisance exists is conclusive and no appeal lies therefrom.[4]

The cleansing of filthy premises is usually accomplished under general nuisance laws by orders and forcible abatement, or it may be secured by enforcing such ordinances or local rules as prescribe cleanliness; but in some states, as Delaware, Maine, Minnesota, and West Virginia, there are special provisions in the statute designed to give the health authorities power to cause private premises to be promptly cleaned if in a filthy condition. The laws in the first three states above mentioned are very similar. The Delaware statute is given below.[5] A similar provision is found in the law establishing a board of health in the City of New York[6] and Detroit. Besides such special orders some cities provide by general rules for the cleansing of premises, as Fitchburg.[7]

[1] New Jersey, General Statutes (1895), p. 1640, Secs. 28–30.

[2] New Jersey, Report of State Board of Health (1897), pp. 155 and 257.

[3] Mississippi, Annotated Code (1892), Sec. 2277.

[4] City of Salem *vs.* Eastern R. R. Co., 98 Mass., p. 449.

[5] Delaware Laws, Vol. 16, Chapter 345:

"SEC. 8. The board of health shall have power, in case of the prevalence, or of reasonable ground to apprehend the prevalence of malignant disease within its jurisdiction, to direct especially the cleansing of houses, cellars, yards, docks, or other such places as the board shall consider requisite or prudent for the preservation of the public health, or for the mitigation of disease, and if such direction shall not be observed and fulfilled, within the time prescribed, by the person or persons to whom the directions were given, the said board shall order an officer of the board, or some other person or persons, to carry the same into effect, and the expenses thereof shall be paid by the person or persons to whom the direction was given, unless the board shall otherwise order; and if payment of the same shall not be made on demand, the treasurer of the board, city council, or town commissioners shall pay the same, and shall recover the same, with interest and costs, from the person who ought to have paid the same, as debts of like amount are recoverable."

[6] New York, Chapter 378 of 1897, Sec. 1176.

[7] Fitchburg, Rules and Regulations of the Board of Health (1897):

"RULE 2. All putrid, decaying or decayed animal or vegetable matter shall be removed from the cellars and outbuildings on or before the first day of June in each year.

"RULE 7. The owner or lessee of any hotel, lodging or tenement house within the limits of the city shall, when in the opinion of the Board of Health or its duly

II. Prohibition of Nuisances.

A. *General State Legislation.*

There has been in the aggregate a great deal of state legislation to prevent nuisances. This may be found in laws of general application and to a still greater extent in special or charter legislation. The general laws in regard to nuisances more often deal with such special subjects as the pollution of potable waters or the regulation of offensive trades, and will be considered in another place. Some state laws, as those of Colorado, Georgia, Utah, and Washington, simply give expression to the principles of common law, defining in general terms what are to be considered nuisances and prescribing methods of procedure and in some cases imposing penalties upon the persons committing them. Often other nuisances than those affecting health are mentioned, and most of this legislation is not such as to be of special interest to sanitary officials. Some statutes of general application do specifically deal with nuisances which usually come under the jurisdiction of boards of health and may be usefully invoked by them in their routine work.

Among states which have legislation of this character may be mentioned: California,[1] Connecticut,[2] Florida,[3] Illinois,[4] Indiana,[5] Iowa,[6] Kansas,[7] Maine,[8] Ohio,[9] Tennessee,[10] Washington,[11] West Virginia.[12] The Ohio law is given in Appendix 26.

Penalties are attached for the violation of the provisions of these statutes and often they are quite severe as shown in the Ohio law. In Illinois the offender shall be fined not exceeding one hundred dollars for the first offence and for a subsequent offence a like amount, and confined in the county jail not exceeding three months. In Iowa the fine is not to exceed one thousand dollars. In Indiana it is from ten

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authorized agent it is deemed necessary, whitewash, paint or otherwise clean and make wholesome the walls and ceilings of the rooms and passage-ways of the building."

[1] California, Penal Code (1886), Sec. 370.

[2] Connecticut, Chapter 237 Laws of 1889.

[3] Florida, Act of 1 June, 1895.

[4] Illinois, Criminal Code (1896), Chapter 38, Sec. 221.

[5] Indiana, Statutes (1894), Sec. 2154.

[6] Iowa, Code (1897), Sec. 5078.

[7] Kansas, General Statutes (1897), Sec. 2453.

[8] Maine, Revised Statutes (1883), Chapter 17, Sec. 5-12.

[9] Ohio, Annotated Statutes (1900), Sec. 6921 *et seq.*

[10] Tennessee, Code (1896), Secs. 5639, 5746-7.

[11] Washington, Chapter 14, Laws of 1895.

[12] West Virginia, Code (1899), Chapter 150, Sec. 20.

dollars to five hundred dollars. In West Virginia the fine is from five dollars to fifty dollars.

In a number of states the court may after conviction for violation of the nuisance laws cause the immediate abatement of the nuisance through the agency of a constable, sheriff or other officer.

B. Special or Charter Legislation in regard to Nuisances.

In some charters a considerable number of provisions are found for the prevention of nuisances. Among the cities that are thus legislated for by statute may be mentioned the City of New York, Pennsylvania cities of the second class and Detroit. In the Detroit law there is a provision requiring and regulating water closets in factories, workshops, offices, etc., and requiring all such to be properly ventilated, and the same regulations apply to schoolhouses. In Pennsylvania cities of the second class all persons are forbidden putting offensive matter in the streets or on lots or in other places where it may be a nuisance; and no person may keep his "premises in such a condition as to be offensive to the neighborhood." This law also regulates the slaughtering of animals and other offensive trades, provides for the construction and sanitary condition of vaults, drains, etc., and regulates the cleaning of vaults. Besides, or in place of specific prohibitions, very broad prohibitions are sometimes found, as in the City of New York, shown below.[1]

C. Local Legislation Concerning Nuisances.

There can be little doubt that power to legislate concerning nuisances is implied when general power to legislate on sanitary affairs is conferred even if nuisances are not specifically referred to. The success

[1] New York Chapter 378, of 1897, Sec. 1220:

"The word 'nuisance,' as used in this act, shall be held to embrace public nuisance, as known at common law, or in equity jurisprudence; and it is further enacted that whatever is dangerous to human life or detrimental to health; whatever building or erection, or part or cellar thereof, is overcrowded with occupants, or is not provided with adequate ingress and egress to and from the same, or the apartments thereof, or is not sufficiently supported, ventilated, sewered, drained, cleaned, or lighted, in reference to their or its intended or actual use; and whatever renders the air or human food or drink, unwholesome, are also, severally in contemplation of this act, nuisances; and all such nuisances are hereby declared illegal; and each and all persons and corporations who created or contributed thereto, or who may support, continue or maintain or retain them, or any of them, shall be jointly and severally liable for, or toward, the expense of the abatement and remedying of the same; but as between themselves, any such persons and corporations may enforce contribution or collect expenses, according to any legal or equitable relations existing between them; but nothing herein contained shall annul or defeat any common law liability or responsibility in respect of nuisances."

of New York and Brooklyn in enforcing the provisions of their sanitary codes attests this. Nevertheless it has been thought advisable in many states to specifically confer such power in regard to nuisances. The following is the Massachusetts law: [1]

"The board of health of a town shall make such regulations as it judges necessary for the public health and safety, respecting nuisances, sources of filth and causes of sickness, within its town, or on board of vessels within the harbor of such town, and respecting articles which are capable of containing or conveying infection or contagion, or of creating sickness, brought into or conveyed from its town, or into or from any vessel. Whoever violates any such regulation shall forfeit a sum not exceeding one hundred dollars."

This has been closely followed in Colorado, Iowa, Michigan, Vermont, and Wisconsin. The New Jersey[2] law gives the board of health power

"To define and declare what shall constitute nuisances in lots, streets, docks, wharves, vessels, and piers, and all public or private places."

This law also gives power of legislation concerning a number of other matters which will be duly considered. In Ohio the board of health may make regulations for "the abatement or suppression of nuisances." Illinois cities and villages may "declare what shall be nuisances and abate the same and impose fines." In Mississippi municipal corporations have power "to make regulations to prevent, remove and abate nuisances." In Louisiana local boards of health may pass ordinances "for defining and abating nuisances dangerous to the public health."

Special and charter provisions also often confer this power. Thus in Baltimore the mayor and city council are to pass an ordinance "to prevent and remove nuisances." The Bridgeport city council has power to pass ordinances "relative to all nuisances." The common council of Chicago is "to abate and remove nuisances and punish the authors thereof by penalties, fine and imprisonment and to define and declare what shall be deemed nuisances." The government of Memphis may "define, prevent and remove nuisances." The board of health of San Francisco also may "define" what shall be a nuisance.

As a rule the number and complexity of these regulations increase with the size of the municipality and the density of the population. Townships and villages need comparatively few ordinances of this kind. Many things may be freely permitted in a sparsely settled region which would be unendurable in a metropolitan city. The end constantly held in view in all these regulations is to secure pure air, pure water and a

[1] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 18.

[2] New Jersey, General Statutes (1895), p. 1636, Sec. 12, II.

pure soil for all men; by pure is meant free from decaying organic matter or its products; free from "filth" and all offensive odors. Therefore rules are made in regard to the disposal of excreta and waste material of all kinds. Cesspools, privy vaults, sewers, drainage and plumbing are to be constructed and maintained in a proper manner. Offensive trades are to be regulated, stables kept clean and refuse of all kinds removed without causing a nuisance. Dwellings are to be properly constructed and not overcrowded, and must be kept clean. A consideration of these local sanitary regulations will be found in the succeeding chapter.

Administrative Methods of Dealing with Nuisances.

Most municipalities of less than 20,000 inhabitants compel their health officer or other executive sanitary official to perform the duties of inspector of nuisances. Occasionally, smaller communities have a sanitary inspector, but he is more often so only in name; practically he is a general executive officer. In New Jersey every town of 2,000 inhabitants must appoint a sanitary inspector, and if he neglects his duty, or if one is not appointed by the town, the state board of health may appoint one at a salary of $50 a year to be paid by the town.[1] Some cities, much larger than 20,000, have no inspector, as the City of Pawtucket with 40,000, and Providence had no permanent special inspector of nuisances until 1883, at which time the population was 117,000. Inspectors of nuisances are sometimes known by this name, but more often as sanitary inspectors and in many places as sanitary police. Occasionally they are called health inspectors, as in Portland, Me., and New Bedford, or sanitary officers or executive officers, as in St. Louis and Wilmington, Del. In some cities, as in Boston, Cleveland, Jersey City, Louisville, Memphis, New York,[2] and Spokane, some

[1] New Jersey, General Statutes (1895), p. 1636, Secs. 30–32.

[2] New York, Chapter 378 of 1897, Sec. 1324:

"The board of health shall make requisition upon the police board for the detail of at least fifty and not more than one hundred suitable officers and men of at least five years' service in the police force, who shall be selected for their peculiar fitness, for the enforcement of the provisions of the sanitary code and the acts relating to tenement and lodging houses. These officers and men shall be detailed to such service by the police board, and the department of health shall pay to the police department monthly, the amount of the pay of the officers and men so detailed, who shall belong to the sanitary company of the police and shall report to the board of health. At least thirty of the officers and men so detailed shall be employed exclusively in the enforcement of the laws relating to tenement and lodging houses. The board of health may report back to the police board for punishment, any member of said company guilty of any breach of orders or discipline, or of neglecting his duty, and thereupon the police board shall detail another officer or man in his place,

or all of the inspectors are regular members of the police force and detailed for sanitary work, and act under the immediate direction of the health department. Under the old law in the City of New York there were detailed for this purpose in 1896, one sergeant, two roundsmen, and forty-seven policemen (men of long experience in the police force of the city). They are known as the sanitary company of police. In many other cities, as Charleston, Denver, Hartford, Jersey City, Mobile, Omaha, Philadelphia, and Providence, the board of health is authorized to call upon the police for assistance in inspection or else such inspections are a prescribed part of the police work. In Chicago the commissioner of health is authorized to appoint five women as sanitary police at a salary of fifty dollars per month.[1]

In New York in 1896, besides the sanitary police referred to above, there was the sanitary bureau, proper, consisting of a superintendent, assistant superintendent, order clerk, complaint clerk, four other clerks, typewriter, chief inspector with two clerks and thirty-eight sanitary inspectors. Under the charter of the City of New York[2] the board of health is to appoint fifty sanitary inspectors and may appoint twenty more. Another provision of the charter is that[3]

"The board of health may, from time to time, engage a suitable person or persons to render sanitary engineering service and to make or supervise practical and scientific sanitary investigations and examinations in the city requiring engineering skill, and to prepare plans and reports relative thereto."

The other large cities have an organization similar to that of New York, though less elaborate, and as we pass to the smaller cities the number of employees becomes less until we at last find only the single health officer. In the smaller cities, where there are only one or two inspectors, they usually work under the immediate supervision of the executive officer of the department, and no formal rules for their guidance are necessary; but in some cities of moderate size and in most of the large cities rules are provided for the conduct of the inspectors. The most elaborate rules are to be found in Atlanta, Augusta, Charleston, and Cincinnati. The rules for the inspectors in Atlanta are given in Appendix 27.

The hours of service vary in different cities, being usually from seven to nine hours a day. Sanitary police however, usually have

and the discipline of the said members of the sanitary company shall be in the jurisdiction of the police department; but at any time the board of health may object to the efficiency of any member of said sanitary company, and thereupon another officer or man shall be detailed in his place."

[1] Chicago, Ordinances (1881), Sec. 1182.

[2] New York, Chapter 378 of 1897, Sec. 1185.

[3] New York, Chapter 378 of 1897, Sec. 1186.

longer hours, the same as the rest of the police force. In many cities, perhaps most, the sanitary inspector, while having working hours fixed by rule are "considered as always on duty." In Denver the inspection hours are 8 A. M. to 4 P. M. with one hour at noon. In Augusta, Ga., from 7 A. M. to 6 P. M. with two hours at noon. In most places a two weeks' vacation is allowed, but this as well as the hours of service is usually the same for sanitary inspectors as for other similar city employees. In almost all the large cities sanitary inspectors are required to engage in no other work. In small places where there is only one inspector or where the health official does inspector's work, all his time is not needed for his official duties. Occasionally in large cities, as in Baltimore, where physicians are employed as inspectors, they are only expected to give a part of their time, as much as may be necessary to do the work laid out. Usually they do not wear a uniform unless as sanitary police they are detailed from the regular police force; but in some cities, as Atlanta, Cambridge, Milwaukee, Cincinnati, Pittsburg, Columbus, Ga., St. Paul, San Francisco, and Reading, uniforms are required. Generally a badge is worn which is exhibited by the inspector to show his authority under the law for entering upon private property and making his examinations. The table given below[1] shows the number of inspectors and their salaries in certain cities.

City.	Population.	Number of Inspectors.	Salary per annum.
Asbury Park, N. J	45,000	2	Chief $1,000 Asst. 750
Atlanta	89,872	7	Chief 1,500
Augusta, Ga	39,441	5[1,4]	 600
Baltimore	508,957	6[4]	1,000
Boston	560,892	16	1,100–1,800
Brookline	20,000	1	
Buffalo	352,219	4[2]	1,000
Cambridge	91,886	3[3,4]	800– 1,000
Charleston	55,807	4	600
Chicago	1,698,575	34	1,000
Cincinnati	325,902	20[4]	600
Cleveland	381,768	20	900
Columbus, O	125,560	8	720
District of Columbia	278,718	7	1,200
Dayton	85,333	2	700
Denver	133,859	11	900
Evansville	59,007	1	936
Hartford	79,850	2	Chief 1,800 Asst. 600

[1] Chief is allowed board of horse.

[2] Six in summer.

[3] Disinfect.

[4] Look after communicable disease.

City.	Population.	Number of Inspectors.	Salary per annum.
Indianapolis	169,164	6[1,2]	
Lowell	94,969	4	$3 00–3 50 per day
Lynn	68,513	2	1,000
Manchester	56,987	2	
Memphis	102,320	12	
Milwaukee	285,315	13[2]	Chief 900; Assts. 800
Minneapolis	202,718	7[2]	900
Newark	246,070	15	2 75 per day
New Haven	108,027	3[1,2]	800
New Orleans	287,104	19[2]	Chief 1,800; Assts. 600
Newton	33,587	3[1,2]	750– 1,000
Pittsburg	321,616	17[2]	Chief 1,000; Assts. 900
Providence	175,597	2	Chief 1,200; Asst. 600
Richmond	85,050	4	
Rochester	162,425	5	600
St. Paul	163,632	6	700
Salt Lake City	53,531	1	1,000
San Francisco	342,782	5[2]	1,200
Somerville	61,643	1	1,000
Syracuse	108,374	2[2]	Chief 1,500; Asst. 900
Toledo	131,822	10[1,2]	
Utica	56,382	3	
Wilmington, Del	76,508	4[1,2]	

From an inspection of the above table it will be seen that the population served by an inspector varies very much in different cities. Of the above cities it is the largest in Providence where there is only one inspector for a population of 87,000. The smallest population for a single inspector is 13,000 in Toledo. The number of persons which one inspector can serve depends somewhat upon the density of the population, though not as much so as one would imagine. While it takes less time to go from house to house in a thickly settled region, the nuisances are usually more numerous and require more attention in such a section. Some cities require more careful inspection, owing to the character of the population, industries, geographical position, or long continued neglect of sanitary work. It is also difficult to compare the work of inspectors, because in some cities they have many more duties than in others. In some cities they apparently do not do more than look after complaints that are made by citizens. In others they make

[1] Disinfect.

[2] Look after communicable disease.

a systematic inspection of premises outside of houses. In other cities, as Boston, Chicago, and New York, considerable time is given to house to house inspection, particularly in tenement house districts, all parts of the houses being examined. In New York City the sanitary police, fifty in number, are detailed exclusively for this work. Again, in some cities, as Augusta, Ga., Baltimore, Cincinnati, Milwaukee, Minneapolis, New Orleans, Pittsburg, San Francisco, and many others, the sanitary inspectors have duties in connection with contagious diseases, such as placarding houses and disinfecting. In San Francisco the plumbing inspectors look after all nuisances connected with plumbing. In Newport the sanitary inspector attends to the flushing of sewers. In other cities, as Charleston, the inspectors have to give much time to enforcing the rules in regard to the removal of garbage. In Detroit two inspectors are detailed especially for this work. In Cleveland the sanitary police collect returns of marriages and births. An average of all the cities in the table gives the population for one inspector as about 30,000.

If there is more than one inspector, the city is divided into districts, and each inspector is assigned to one district and confines his work to it, and thus becomes familiar with it. In Denver this division is a ward. In Newark there is one inspector for each district and also one at large.

Usually inspectors report at the health office daily, sometimes twice a day as in Providence. In New York City they report at the department twice each week, different inspectors reporting on different days. Inspectors in Denver communicate with the office by telephone twice daily besides reporting in person at 4 P. M. daily to write up their day's work in the record book in the office. In Charleston the sanitary inspectors are required to visit fifty premises daily, and they report each day at noon, bringing a report with fifty signatures of the occupants of the premises they have inspected.

Except in systematic house to house inspection the first step in the suppression of nuisances is the entering of a complaint — citizen's complaint as it is called. Large numbers of such complaints are everywhere received, showing that the public expects, demands, and needs protection from nuisances. In some cities anonymous complaints receive no attention, as Brookline, Elmira, and Syracuse. In Albany, Reading, and Scranton it is forbidden by rule to look up such complaints, but in other places they are noticed. The experience of the writer has been that anonymous complaints are about as likely to be well founded as are those where the name of the complainant is given. A considerable number of citizens' complaints are based on spite, or are due to an unreasonable fastidiousness. The proportion of unfounded complaints in

Providence is about twenty-five per cent. In Newark it is reported to be about the same. Citizens' complaints are usually entered in a book by a clerk or whoever attends to the office. In Buffalo the complaint book is classified by streets. In some places blanks are furnished the complainant on which the formal complaint can be written, or it is written on such a blank for him by the clerk. These may be kept on file in the office or they may be given to the inspector as his memorandum. The form of the complaint blank used in Buffalo is shown in Appendix 28. Sometimes the inspector in his rounds uses a plain memorandum book for his notes or he may have one with printed blanks. The form used in Providence is about $3\frac{1}{2}$ by $5\frac{1}{2}$ inches and contains blanks for the location, owner's name and address, description of the nuisance and the officer's signature.

It is primarily the duty of the inspector to report the results of his visit to the central office, though he is often expected and required to give advice and directions in regard to minor matters as occasion offers during his rounds. Sometimes, as in Philadelphia, he is to issue and serve a formal notice as soon as a nuisance is discovered. In such case he would report the service and the nuisance together at the office of the department. In small places where there is only a health officer, or one sanitary inspector, such officer must himself enter his reports in the office, file, record and index them and make out the orders, etc.; but in larger cities the office work of recording and indexing is often done by special clerks. In these cities the inspectors make a formal return for each nuisance found, or if it is a citizen's complaint, or the inspection for contagious disease, or a house to house inspection, a single slip is often handed in for each inspection. The inspector's report in Buffalo is exactly like the complaint form shown in Appendix 28. In New Haven the inspector carries with him a book of notices shown in Appendix 29, and fills them out as he goes along. When he returns to the office he copies them on their stubs and then sends them to the owners of the properties inspected. In Boston, Denver, Indianapolis, Newark, St. Louis, and a number of other cities a special sanitary inspection is made in each case of communicable disease, and often a special blank form is prepared for making a return of the same. Some of these are shown in the Appendices to Chapter X.

Besides making reports of individual nuisances, inspectors are frequently required to send in each day or at other stated intervals, summaries of the work done by them. Besides the reports of the individual inspectors, weekly or daily reports of chief inspectors are frequently filed, or summaries made of the work of all the inspectors.

A weekly summary of the work of the sanitary inspector is made by

the chief inspector in the City of New York, in which the inspections are tabulated as inspections of tenement houses, lodging houses, private dwellings, etc., fifteen items in all. This report is on a double foolscap sheet. For the weekly report of the sanitary police, the chief inspector uses a similar sheet, only the classification of their work is much more complete, as their services are classified under thirty-nine heads and the nuisances acted on are classified under seventy heads.

House to House Inspection.

A few cities, of which New York and Boston are conspicuous examples, carry out a systematic inspection of the houses of certain districts. Other cities in considerable number have at times undertaken a general and thorough dwelling or tenement house inspection in time of impending pestilence, or as the part of a spasmodic effort to put the city in better sanitary condition. As long ago as 1884 the Illinois state board of health made a strong effort to induce all the municipalities in the state to undertake such an inspection as a part of its proposed "sanitary survey," and its efforts have met with very general success. In New Jersey, too, owing largely to the efforts of the state board of health, a number of municipalities make such an annual inspection. In Minnesota the law requires the health officer to make such an inspection in May of each year,[1] and in Florida the rules of the state board of health require inspection in cities between 1 May and 1 November. Among other cities which maintain such a house to house inspection are Fitchburg, Mass., Lowell, and Philadelphia. In Lowell a card index is kept, which shows at a glance the sanitary condition of the houses. Many health officers in their reports urge the desirability of such an annual house to house inspection, at least in the tenement districts, and are deterred from making it, simply from lack of funds. Money for such purposes will be granted freely in the face of an epidemic, but withheld at other times. In this connection it may be mentioned that the City of Newton, Mass., in the summer of 1895 made 5500 house to house inspections at a cost of $650, or less than 12 cents per inspection.

New York presents the best example of house to house inspection. For many years such an inspection has been made twice each year in the tenement house districts. In 1896 the city was divided into thirty-one districts, and for the service there were detailed from the regular police force, forty-seven patrolmen, two roundsmen, and one sergeant. These sanitary police also have to inspect lodging houses and look after the abatement of nuisances. The result of the inspection in 1896 was

[1] Minnesota, Statutes (1894), Sec. 7048.

the abatement of 38,858 nuisances; the number of houses inspected was 42,909.

Examples of forms for house to house inspections may be found in Appendices 30 to 32.

Nuisances of whatever kind, when reported to the health department, should be properly recorded. The usual way is to keep such a record in a book. The form used in Providence is shown below.[1]

This book is indexed by owners' names, but it is an excellent plan to have a street index as well. Another method is to keep the record of nuisances on index cards. In Buffalo the report of the inspector (shown in Appendix 28) is put in an envelope 7 by 9 inches, together with any other papers relating to the case and endorsed on the corner as shown below[2] and filed in drawers, being arranged by streets.

It is sometimes required that records of nuisances shall be open to the public.

Orders.

After the report of the inspector has been filed in the health office, the next step is the notification of the owner to abate the nuisance. It is only exceptionally that an order to abate a nuisance can be mailed as was provided in the old New York City law, and even then if prosecution was contemplated a personal notice was usually made. Most nuisance laws require that the order shall be formally served personally, or by leaving at the usual place of abode. This is always considerable trouble and often a matter of much difficulty. Hence it is a common practice

[1] SIZE OF PAGE 13 x 16 INCHES.

Date of Complaint.	No.	LOCATION.	OWNER.	Date of Inspection.	CONDITION.	ACTION TAKEN.
	2377					
	2378					

[2] No.....Complaint.....Street.....Owner.....Address.....
Notified.....Expires.....Inspected by.....

to send by mail a letter to the person in charge of the property calling his attention to the nuisance and requesting its prompt removal and perhaps designating the rule, ordinance or statute under which further proceedings may be taken. Often also the inspector at the time of his visit may be able to give such verbal directions and advice to the owner, agent or occupant as will result in the prompt suppression of the nuisance. These informal notices are not relied upon when the necessity for prompt action is very great, or in those cases when it is known that the owners are liable to be dilatory, but they can safely be sent in a large proportion of cases, and in a majority of them they receive prompt attention. If it is intended that the next procedure on the part of the board of health shall be a prosecution for violation of any specific legislation forbidding the nuisance in question, no further order is necessary. When a person permits or commits an act which is definitely forbidden by statute or by a rule of a board of health properly adopted and promulgated it is not required that notice of any kind shall be given before legal proceedings are taken. If it is done, it is a gratuitous proceeding on the part of the sanitary authorities, and is done because experience has taught that in a large proportion of cases such an informal notice is all that is necessary to secure the abatement of a nuisance. Below is a simple form of blank which may be used by properly filling, to fit nearly all cases.[1] Most large cities, besides such a general form, have

[1] SIZE 4 x 10 INCHES.

Ward .

No.

Name { Owner. Occupant. Agent.

Nuisance

Location

Inspection made 18

By

Filed in sanitary office.

SANITARY DIVISION — HEALTH DEPARTMENT.

Ward

No. St. Louis 189..

To { Owner. Occupant. Agent.

You are hereby notified that a nuisance exists in the form of

at

which you are requested to abate or remove at once.

Respectfully,

Inspected by

MAX C. STARKLOFF,
Health Commissioner.

Sanitary Officer.

special blanks, which need no filling out, for the more common forms of nuisances such as privy vaults, cesspools, stable manure, obstructed drains, leaking sink pipes, hog pens, etc. In New York City a blank form of notice is used and posters specifying the particular form of nuisances referred to are fastened to the order. In Denver a summary of some twenty-five of the principal sections of the sanitary ordinance is printed on the back and the nuisance to be abated is referred to by the corresponding number on the face of the order.

While it is true as was before stated that a formal service of a notice is not usually necessary, preparatory to a criminal action for the violation of such ordinances and rules as forbid specific nuisances, yet sometimes such a notice is required by the ordinance itself. The provision given below is from an ordinance adopted in St. Louis, 19 January, 1897.[1] Similar ordinances are found in Milwaukee and Charleston.

As has been shown, the general nuisance laws almost always require that a formal notice or order shall issue for the abatement of the nuisance. Such orders are usually issued by the board of health or health commissioner, and often by the executive officer of the board of health, and occasionally by the sanitary inspector or by other officers than sanitary officials. Among cities which authorize inspectors to issue orders may be mentioned Augusta, Ga. Atlanta, Newport, R. I., Cambridge (in certain cases), Youngstown, O., and Denver. It is in some statutes prescribed that such notices shall be in writing and they are almost always signed by the president or secretary, or clerk of the board of health, or by the executive officer. It is often required by law that a record shall be kept of all such orders issued, and certainly this is the usual custom. Commonly such a record is kept in a book provided for that purpose. Besides the record book, the original orders are often kept on file in the office, copies being served on the parties interested. In Providence where the board of aldermen is the board of health, the original orders are kept on file in the office of the city clerk who is clerk of the board, and they are also copied into the records of the meeting. Besides this they are noted in the "nuisance book" which is kept in the office of the health department. The Massachusetts nuisance law is the oldest, and has served as the pattern for many others. The orders issued under it in Boston are shown in Appendix 33. The forms used in Ohio and Rhode Island are shown in Appendices 34 and 35. The forms in use by most local boards will be found more or less like these. The phraseology must,

[1] In the trial of any person charged with a misdemeanor, as defined by this ordinance, it must be shown that said party has been notified by the officers of the health department, or by a notice served by the city marshal, to remedy the matter complained of, and that he or she had failed to obey such notice.

of course, vary somewhat to correspond to the different statutes. The original almost always has a blank on the reverse for the record of service by the proper officer, and a duplicate or copy, but without the service blanks, is left at the usual place of abode, or served as otherwise prescribed. Often the statute or ordinance is printed on some portion of it. Often the copy is made to present a different appearance from the original, being perhaps printed on different colored paper.

In Philadelphia the nuisances are abated by the board of health under the Act of 29 January, 1818. First "complaints" are made out on blanks as in many other cities and given to the inspector. After examination of the premises, the inspector returns the "complaint" with a report of the "nuisance" upon the back. An order is then made out in the office and a copy served by an inspector in whose district the owner lives. A reprint of the office copy is shown in Appendix 36. After the lapse of the required time, the office order is given to the inspector who reports on the back whether it has been complied with. If it has not been the board of health may provide for the summary abatement of the nuisance and this order also is written on the back. Besides reporting his own nuisance work each inspector in Philadelphia makes a weekly return of all notices or bills served for other inspectors.

After service of the notice to abate a nuisance and after the lapse of the time specified in the notice, one or more inspections are necessary to see that the order has been obeyed. Theoretically, the inspection should be made immediately upon the expiration of the time given, and if the order has been neglected the penalty should at once be imposed. This, however, is probably rarely the practice. Ample leeway is given in most cases, particularly if it is not believed that the delay is wilful and if the case is not an especially pressing one. Often very much more than the specified time elapses before the inspection. Such a delay is not so common in the larger cities as in the smaller ones. A report and record of secondary inspections must, of course, be made. Sometimes it is endorsed on the back of the "complaint" as in Philadelphia. Often the result of the inspection is simply noted in the record book. In New York City a separate column in the book is given to each inspection, the name of the inspector being indicated. Often an extension of time is asked for, and it is usually granted if the request appears at all reasonable. As a general thing it may be said that the health officer and others intrusted with this part of sanitary administration are too lenient rather than too severe in dealing with this class of offenders against decency and health. Often a final formal warning notice is sent before any further steps are taken by the authorities.

If a person who has been asked to abate a nuisance fails to do so,

two, or in some cases, three methods may be employed by the authorities.

FIRST. The guilty person may be proceeded against in court and a fine imposed. Usually the matter is for this purpose placed in the hands of the police or law department of the city, or the attorney of the health department in the few cities which have such an officer. The duty of the inspectors in the case is chiefly that of furnishing testimony. This testimony may be from memory or from inspectors' note books or from the books or papers on file in the office. Sometimes, again, the law department, when a case is referred for prosecution, sends out a notice that action is about to be taken, thus giving another short period of grace.

The great objection to procedure by prosecution and fine in nuisance cases is that many times the desired end is not secured owing to the law's delay. If an appeal is taken as it is frequently, months or years may elapse while the case is pending, and all this time the nuisance may continue unabated. The right of appeal is however, sometimes denied. Thus in Mississippi,[1]

"The district judge shall try all cases declared a nuisance by the state board of health, and there shall be had a jury trial if desired and there shall be no appeal."

In Wilmington, Del., the statute provides in case of failure to comply with an order of the board of health for a fine to be recovered in the municipal court of the city, or in default of the same commitment to jail, and "from the judgment of said court in such cases there shall be no appeal."

SECOND. As has been shown, a nuisance, after the formalities required by law have been complied with, may be summarily abated. Nearly all the nuisance laws provide that the authority which is empowered to order nuisances abated also has power if its orders are not complied with to peremptorily abate the nuisance. This is effectual, and though it may subject the municipality to a suit for damages, it is far preferable to be a defendant than a plaintiff in such a case, and it is not common to find the decision of the board of health as to a nuisance overruled by the courts after its abatement. A practical objection to this method of dealing with nuisances is that it entails a considerable expense. This money, while ultimately to be returned to the treasury, is a loss during the time occupied by the legal proceedings necessary for its recovery. Furthermore, the cost of abating nuisances, when actually recovered, often goes into some fund other than that controlled by the health department, and hence is a net loss to that department. Some-

[1] Mississippi, Annotated Code (1892), Sec. 2277.

times, too, as in New Haven and Philadelphia, it is necessary to defray the cost of abating nuisances out of an appropriation made for that purpose, and such an appropriation is not always forthcoming. It follows that this summary method of dealing with nuisances is not employed as generally as might be expected. It is common in Philadelphia and in the municipalities of Ohio.

In Philadelphia, after the board of health has determined on the abatement of a nuisance, this fact with the name of the contractor is endorsed by the health officer on the back of the original order. When the work is done the bill for the same is presented to the owner by an inspector. If not paid, it is referred to the proper legal officer for collection. In Newport, R. I., the inspector of nuisances when an order to abate is not obeyed, and the cost of abatement will not be more than ten dollars, is authorized to at once abate the same, the costs to be "sued for by him in an action of assumpsit;"[1] but it is unusual to give inspectors such powers. In Philadelphia in a suit to recover the costs of abating a nuisance "the fact of the nuisance shall not be enquired into."[2] In New Jersey it is provided that the courts shall not enjoin a board of health for abating a nuisance until such board has been given a hearing, and also that in case no nuisance is shown to exist the board of health is not liable unless it is shown that it acted without reasonable cause.

THIRD. Another and very effective, though indirect method of securing obedience to sanitary orders is not unfrequently employed by health authorities. This is the vacation of premises which are deemed to be in an unsanitary condition. The following is the Massachusetts law enacted in 1850:[3]

"The board, when satisfied upon due examination that a cellar, room, tenement, or building, in its town, occupied as a dwelling-place, has become, by reason of the number of occupants, want of cleanliness, or other cause, unfit for such purpose, and a cause of nuisance or sickness to the occupants or the public, may issue a notice in writing to such occupants, or any of them, requiring the premises to be put into a proper condition as to cleanliness, or, if they see fit, requiring the occupants to quit the premises within such time as the board may deem reasonable. If the persons so notified, or any of them, neglect or refuse to comply with the terms of the notice, the board may cause the premises to be properly cleansed at the expense of the owners, or may remove the occupants forcibly and close up the premises, and the same shall not again be occupied as a dwelling-place without the consent in writing of the board. If the owner thereafter occupies or knowingly permits the same to be occupied without such permission in writing, he shall forfeit not less than ten nor more than fifty dollars."

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[1] Newport Ordinances, Chapter 24, Sec. 4.

[2] Pennsylvania, Brightly's Purdon's Digest (1895), p. 1433, (Act of 7 April, 1830, Sec. 2.)

[3] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 24.

Similar laws are found in Colorado, Delaware, Iowa, Maine, New Hampshire, Rhode Island, and South Carolina; and there are like provisions in the special sanitary legislation of various cities, as Detroit, Memphis, and San Francisco. The form of order served upon the tenants in Boston under the Massachusetts law is shown in Appendix 37.

A curious case occurred in Boston, where the tenants in two houses just alike were ordered to remove. They obeyed the order by exchanging tenements and thus frustrated the purpose of the board of health. Finally, however, an order to vacate in thirty minutes was issued, and this not being obeyed, the houses were closed up.

As has been shown, a number of states provide by statute for the vacating of unsanitary houses. Outside of these states, a number of cities have considered it within the sphere of their sanitary powers, though it might not have been expressly so stated in their charters or the general legislation establishing their sanitary authority. Several such cities have therefore in their ordinances or rules provided for the vacation of unsanitary dwellings. Among such cities may be mentioned Bridgeport, Buffalo, Chicago, Minneapolis, Newark, Paterson, Rochester, and San Francisco. Again, in some cities in states where the vacating is provided for by statute, local rules specify more closely under what conditions and in what manner action shall be taken. In Fitchburg,[1]

"Whenever, upon due examination, it shall appear to the Board of Health that any tenement or building is not furnished with vaults constructed according to the provisions of these Regulations, or with sufficient privies or water-closets, or drains under ground for waste water, they will thereupon issue their notice, in writing, to the occupants, or any of them, requiring them to remove and quit such tenement or building within such time as the Board shall deem reasonable, and the same shall not be again occupied as a dwelling place without the consent, in writing, of the Board."

In Holyoke, Mass.,[2] houses will be vacated if there is not 400 cubic feet of air space for each occupant for sleeping room. This vacating of tenements is employed not only when the houses are entirely unfit for habitation and so dilapidated as to be impossible of repair, but it is made use of in cases of obstructed and broken drains, and defective plumbing and accumulations of filth. It is sometimes the quickest way to bring landlords to terms and secure the abatement of nuisances which might be proceeded against in other ways. A landlord will often adopt every legal expedient and make use of every delay and excuse to put off abating a nuisance, when he would attend to it promptly if his attention was called to it by loss of rent, because of a vacant house.

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[1] Fitchburg, Rules and Regulations of Board of Health (1897), p. 10, Sec. 3.

[2] Holyoke, Rules and Regulations of Board of Health (1897), Sec. 27.

When a dwelling has been vacated the best way to insure that it shall not again be occupied is to tear it down. Moreover, by this procedure, whatever nuisance exists will surely be abated. When an order to vacate premises is issued because of some defect which though serious in itself may be easily remedied, it would of course be unreasonable to destroy for such a cause, what is otherwise valuable property: and indeed in such cases, whatever the defect may be, it is usually promptly remedied by the owner: but when the dwelling is so out of repair and filthy as not to be worth the necessary improvements required to make it a habitable structure, the best course is to demolish it. This is not infrequently done under general nuisance laws. Sometimes special provision is made by statute for the destruction of such unwholesome dwellings. Thus in Memphis[1] the government of the city

"Shall have power, and it shall be their duty to condemn as nuisances all buildings, cisterns, wells, privies, and other erections in the Taxing District which, on inspection, shall be found to be unhealthy, and to cause the same to be abated, unless the owners thereof, at their own expense, upon notice, shall reconstruct the same in such manner as shall be prescribed by the laws of the Taxing District."

Under this provision many buildings are condemned and destroyed each year. In New York City a few years ago by a special act[2] authority was given to condemn and destroy unwholesome tenement houses. This law has now been incorporated in the charter of greater New York as Sections 1515–16. It provides that the board of health may condemn and order the removal of any building which, from age, defects, structure or position, is a danger to its inhabitants or the inhabitants of adjacent buildings and the defects of which cannot be remedied; but the owners may institute proceedings in the supreme court for the condemnation of the building. The court, if it is proved that destruction is necessary, appoints a commission to determine the damages. If the building "is unfit and not reasonably capable of being made fit for human habitation," the compensation shall be the value of the material in the building. Under this law during the year 1896, eighty-four houses were vacated for the purposes of condemnation.[3] Some of these cases were brought into court and the action of the board of health was upheld by the lower courts, but the only case which ever went to the appellate division was dismissed on technical grounds. A similar law has been enacted for Boston.[4] Under this law any building may there be vacated.

[1] Memphis, Ordinances, 1879, Sec. 162.

[2] New York, Act of 9 May, 1895.

[3] New York, Board of Health Report, 1896, pp. 37–41. This report contains a description of some of these premises.

[4] Massachusetts, Chapter 210 of 1897, and 222 of 1899.

"Because of age, infection with contagious disease, defects in drainage, plumbing or ventilation, or because of the existence of a nuisance on the premises which is likely to cause sickness among its occupants, or among the occupants of other property in said city, or because it makes other buildings in said vicinity unfit for human habitation or dangerous or injurious to health, or because it prevents proper measures from being carried into effect for remedying any nuisance injurious to health, or other sanitary evils in respect of such other buildings, so unfit for human habitation that the evils in or caused by said building cannot be remedied by repairs or in any other way except by the destruction of said building or of any portion of the same."

It may then be destroyed and the damages sustained by the owner shall be paid by the city. The damages are to be determined by agreement between the owner and the board of health, and are to be assessed by jury, as are highway damages. In Boston in 1899 ninety-two buildings were condemned.

STATUTES CONSULTED IN THE PREPARATION OF THIS CHAPTER.

ALABAMA. Code (1896), Secs. 2408, 2429.
ARIZONA. Definition, Penal Code (1887), Secs. 600–5.
ARKANSAS. Powers of Cities, Statutes (1894), Sec. 5131.
CALIFORNIA. Definition, Penal Code (1886), Secs. 370–4.
COLORADO. Act of 17 April, 1893, Secs. 6, 10–14.
CONNECTICUT. General Statutes (1888), Sec. 2592.
Deposit of filth, Chapter 237 of 1889.
DELAWARE. Revised Code (1893), p. 298, (Laws of Delaware, Vol. 16, Chapter 345, Secs. 3–8.)
FLORIDA. Revised Statutes (1892), Sec. 773.
Act of 1 June, 1895.
GEORGIA. Chapter 143 of 1895.
Definition, Code (1882), Secs. 2997, 4094–4100.
ILLINOIS. Powers of Cities, Annotated Statutes (1896), Chapter 24, Sec. 63.
Definition, Annotated Statutes (1896), Chapter 38, Sec. 369.
INDIANA. Act of 28 April, 1899, Sec. 8.
Definition, Statutes (1894), Sec. 2154.
Powers of Cities, Statutes (1894), Secs. 3541, 3794.
IDAHO. Definition, Statutes (1887), Secs. 3620–25.
IOWA. Annotated Code (1897), Secs. 2568–9.
Definition, Annotated Code (1897), Sec. 5078.
Powers of Cities, Annotated Code (1897), Secs. 696–9, 1032.
KANSAS. Powers of Cities, General Statutes (1897), Chapter 32, Sec. 88, *eleventh*.
KENTUCKY. Statutes (1894), Secs. 2055, 2057–9.
LOUISIANA. Chapter 182 of 1898, Sec. 7.
MAINE. Supplement Laws (1895), Chapter 17.
MARYLAND. Public General Laws (1888), Art. 43, Sec. 5; Chapter 622 of 1890.
MASSACHUSETTS. Public Statutes (1882), Chapter 80, Secs. 18–27.
MICHIGAN. Compiled Laws (1897), Secs. 4412, 4417–23.
Powers of Municipalities, Compiled Laws (1897), Secs. 2816, 3125.
MINNESOTA. Statutes (1894), Secs. 7050–3.
Powers of Cities, Statutes (1894), Secs. 970–6, 1224, *twenty-third*, 1299.
Definition, Statutes (1894), Sec. 6613 *et seq.*
MISSISSIPPI. Code (1892), Sec. 2277.
Powers of Cities, Code (1892), Sec. 2928.

MISSOURI. Revised Statutes (1899), Secs. 6951–74.
Definitions, Revised Statutes (1899), Secs. 2234–9.
Powers of Cities, Revised Statutes (1899), Secs. 5281, 5393, 5455, 5707, 5838, 5842, 5961, 6010, 6164.
MONTANA. Definition, Penal Code (1895), Sec. 672 *et seq.*
NEBRASKA. Definition, Compiled Statutes (1899), Sec. 6890 *et seq.*
Powers of Cities, Compiled Statutes (1899), Secs. 794, 1031, 1032, 1226.
NEW HAMPSHIRE. Public Statutes (1891), Chapters 108–9.
NEW JERSEY. General Statutes (1895), p. 1644, Secs. 61–66.
NEW MEXICO. Powers of Cities, Compiled Laws (1897), Sec. 2402 (45).
NEW YORK. Revised Statutes (1896), p. 2418, Public Health Law, Secs. 25–27.
NORTH CAROLINA. Act of 1 March, 1893, Sec. 22.
Definition, Code (1883), Secs. 1297–1324.
NORTH DAKOTA. Code (1895), Secs. 259–60.
OHIO. Annotated Statutes (1900), Secs. 2116, 2122, 2128.
Definitions, Annotated Statutes (1900), Secs. 6919–27.
Powers of Cities, Annotated Statutes (1900), Secs. 1692, 1878, 1934.
PENNSYLVANIA. Powers of Cities, Brightly's Purdon's Digest (1894), p. 1432, Secs. 123–134; p. 1558, Sec. 134; p. 240, Secs. 88–90.
RHODE ISLAND. General Laws (1896), Chapter 91.
SOUTH CAROLINA. Revised Statutes (1893), Sec. 962.
Act of 5 January, 1895, Sec. 4.
TENNESSEE. Powers of Cities, Code (1896), Secs. 1915(2), 1924.
Definition, Code (1896), Secs. 6750–6.
TEXAS. Powers of Cities, Revised Statutes (1895), Secs. 447, 542.
UTAH. Revised Statutes (1898), Sec. 1107.
Chapter 45 of 1899.
VIRGINIA. Code (1887), Secs. 1728.
Act of 7 March, 1900, Sec. 5.
VERMONT. Statutes (1894), Secs. 4678–80.
WASHINGTON. Codes and Statutes (1897), Sec. 3000.
Powers of Cities, Codes and Statutes (1897), Secs. 739, 855, 942, 1015.
WEST VIRGINIA. Code (1899), Chapter 150, Sec. 20e I–III; Chapter 179, Secs. 10–12.
WISCONSIN. Statutes (1898), Sec. 1414.
Powers of Cities, Statutes (1898), Secs. 892, 925–52(6), (36), (37).
WYOMING. Chapter 76 of 1899.

ATLANTA. Chapter 109 of 1874, Secs. 67–71.
BOSTON. Demolishing buildings, Massachusetts, Chapter 219 of 1897, and 222 of 1899.
BUFFALO. Chapter 105 of 1891, Sec. 237.
BRIDGEPORT. Act of 22 March, 1877, Sec. 24.
DETROIT. Chapter 10 of 1895, Secs. 17–19.
HARTFORD. Ordinance of 27 June, 1885, Secs. 5–6, "validated" by Act of 3 March, 1886.
MEMPHIS. Chapter 11 of 1879, Sec. 3.
MILWAUKEE. Chapter 184 of 1874, Sub-Chapter 13, Secs. 4–5, and Chapter 30 of 1878.
MINNEAPOLIS. Chapter 413 of 1889, Secs. 9–10.
NEW HAVEN. Chapter 418 of 1897, Sec. 97.
NEW YORK CITY. Chapter 378 of 1897, Secs. 1229, 1287–1294.
Demolishing buildings, Act of 9 May, 1895.
PROVIDENCE. Rhode Island, Chapter 598 of 1866, Sec. 9, Clause 1.
ST. LOUIS. Revised Statutes (1899), Secs. 9465–6.
SAN FRANCISCO. Political Code (1886), Secs. 2038, 3028.
WILMINGTON. Delaware Laws, Vol. 20, Chapter 550, p. 664.

CHAPTER IV.

SPECIFIC NUISANCES.

IN the first chapter it was shown that most local governments have been given very great legislative power in regard to sanitary affairs. Sometimes, as in the Massachusetts law and those which follow it, rules may be made "respecting nuisances" or for the "prevention of nuisances." In other cases rules forbidding nuisances may be made by virtue of the power to legislate "for the promotion of health." Sometimes it is the board of health or health officer who has this power, but more often it is the proper legislative branch of the local government. But, however they may be made, almost every city, and innumerable towns, villages, and townships have their sanitary codes, ordinances, regulations, or rules. A considerable portion of these regulations are taken up with the consideration of nuisances. This is particularly true of the large cities where the complexities of urban life make it much more likely that a man will give offence to his neighbor than in rural districts.

While very many communities, particularly the smaller cities and towns, abate nuisances under state laws enacted for that purpose, as described in the last chapter, many others proceed in a different way. Instead of issuing an order for removal and then proceeding to fine the offender or abate the nuisance if the order is not obeyed, it is customary when a nuisance is found to prosecute the offender for the violation of a municipal ordinance, though usually a preliminary notice is sent. In one case the offender is fined for failure to obey a definite order, in the latter for disobeying an established ordinance. Among important cities which follow the latter method are Baltimore, Chicago, Denver, Minneapolis, Newark, New York, and St. Louis.

In pursuance of the powers granted, very many boards of health exercise their legislative functions in defining what shall be considered nuisances and forbidding the same and affixing penalties for the violation of their rules. Sometimes the rules thus adopted are very general in their terms not specifying at all in detail the acts which are forbidden, but more often such general provisions are found in the statutes as shown on page 123. Another example of a very general statutory provision forbidding nuisances is found in the charter of the City of New

York[1] and is shown below. Such general prohibitions are usually not relied on, and specific declarations of nuisances and the prohibition of particular acts are found by most sanitary authorities to be useful, and it is the purpose of the following pages to consider some of these.

Filth.

As by far the larger number of nuisances have to deal with filth in one form or another, rules relative to accumulations of filth of various kinds and their removal, are found in all local sanitary legislation. The following are examples of some of these rules:

"SEC. 2. Any person or owners, agent, lessees or occupants of any building, yard or lot of ground, who shall allow to accumulate or remain in or on said building, yard or lot of ground, any putrid and unsound meat, pork, fish, hides. decayed vegetables or food, manure, filthy ash heaps, garbage, offal, rubbish, dirt or filth of any kind, which, by its decay or putrefaction, could or would become offensive to human beings. or detrimental to health, or shall create a nuisance, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than ten nor more than one hundred dollars, to be recovered for the use of the City of St. Louis, before any court having competent jurisdiction.

"SEC. 6. The words filthy ash heaps, whenever used in this ordinance, shall be held to include cinders, coal and everything that usually remains after fires that has been mixed with garbage or filth of any kind; the word rubbish shall be held to include all loose and decayed material and dirt-like substances that attends use or decay, or which accumulates from building, storing or cleaning; the word garbage shall be held to include every accumulation of both animal and vegetable matter, liquid or otherwise, that is received from kitchens, and also all putrid and unsound meat, beef, pork, fish, decayed or unsound vegetables or fruits; the word tenement house shall be taken to mean and include every house, building, or portion thereof, which is rented, leased or hired out to be occupied as the home or residence of more than two families living independent of one another.

"SEC. 7. Whenever any owner or agent of any building in the City of St. Louis shall rent, lease or hire out to be occupied, any building, or parts thereof, as a home or residence of more than two families living independent of one another or a building to different persons for stores and offices in said building, giving to each family or person the common right to halls, yards, water closets or privies, or some of them, then such owner or agent shall be liable for the condition of said halls, yards, water closets or privies, and said owner or agent may also be made a defendant in a prosecution for the violation of the provisions of this ordinance, and be subject to fine,

[1] New York, Chapter 378 of 1897, Sec. 1201:

"It is hereby delared to be the duty of every owner and part owner and person interested, and of every lessee, tenant, and occupant of, or in any place, water, ground, room, stall, apartment, building, erection, vessel, vehicles matter and thing in said city, and of every person conducting or interested in business therein, or thereat, and of every person who has undertaken to clean any place, ground or street therein, and of every person, public officer, and department having charge of any ground, place, building, or erection therein, to keep, place and preserve the same and every part, and the sewerage, drainage and ventilation thereof in such condition, and to conduct the same in such manner, that it shall not be a nuisance, or be dangerous or prejudicial to life or health."

the same as the occupant of the premises, and any prosecution for violation of this ordinance may be maintained against the occupants, owner and agent of the premises, or either or all of said parties." [1]

In other instances the rule takes the form of a direction to keep the premises clean and in order:

"SEC. 508. No person shall suffer or permit any cellar, vault, privy drain, pool, sink, privy, sewer, or other place upon any premises or grounds belonging to or occupied by him or them, to become offensive or injurious to public health.

"SEC. 510. No owner or occupant or other person having control or charge of any lot, tenement, premises, building or other place shall cause or permit any nuisance to be or remain in or upon such lot, tenement, building, or other place, or between the same and the centre of the street, lane or alley adjoining." [2]

Filth in Streets.

While filth upon a private property may be a nuisance, on a street or public place it is certain to be so. When a nuisance of this kind exists on private property, ample provision is made in most states for its abatement and usually this can be accomplished before much harm is done. When, however, filth is thrown or left upon the street, thousands of persons may be affected before it can be removed; and as it is usually difficult to find the person who deposited the filth and compel him to remove it, the cost of removal must be borne by the city. Hence in all cities effort is made to have clean streets, not only by a systematic cleaning by the municipality, but also by attempting to prevent by ordinance the deposit of dirt of any kind in the street. Some of these rules are here given:

"SEC. 1381. That no swill, brine, urine of animals, or other offensive animal substance, nor any stinking, noxious liquid or other filthy matter of any kind, shall by any person be allowed to run or fall from out of any building, vehicle or erection into or upon any street or public place, or be taken or put therein, save as herein elsewhere provided.

"SEC. 1382. That no butcher's offal or garbage, nor any animals nor any putrid or stinking animal or vegetable matter shall be thrown by any person, or allowed to go into any street, place, sewer or receiving basin, or into any river, canal, slip or standing or running water, or excavation, or upon any ground or premises in the said city." [3]

While in some cities, as Philadelphia, Baltimore, and others in the south, the gutters are used as sewers for the conveyance of waste water other than that from water-closets, this practice is not generally considered advisable and is being gradually discontinued in the cities mentioned. This discharge of waste water into the gutters is therefore generally forbidden:

[1] St. Louis, Ordinance of 18 January, 1897, Secs. 2, 6, and 7.

[2] Cleveland, Ordinances (1892), Chapter 30, Secs. 508–510.

[3] Chicago, Ordinances (1881), Secs. 1381–82.

"No person shall use the streets or sidewalks of the city, nor the gutters between, as a drainage to carry off any water that has been used, or other fluids, or soap-suds or dye-stuffs, or liquid manures, or any other liquids, whether from privies or otherwise. Any person discharging, or allowing to be discharged, any such fluids, shall, on conviction of the fact, be fined in a sum not exceeding twenty-five dollars and costs, or condemned to work in the chain-gang not to exceed thirty days, either or both, in the discretion of the court."[1]

Other causes of filthy streets are forbidden; thus in Boston "No person shall wash or otherwise clean any animal or vehicle, or shake or otherwise clean a mat or carpet in any street,"[2] and similar rules are found in other Massachusetts cities. The washing of vehicles is also forbidden in other cities by the regulations relating to stables. The following forbids the deposit of rubbish in streets:

"Sec. 1387. That no lime, ashes, coal, dry sand, hair, feathers or other substance that is in a similar manner liable to be blown by the wind, shall be sieved, or agitated or exposed; nor shall any mat, carpet or cloth be shaken or beaten, nor any cloth, yarn, garment or material or substance be scoured, cleaned or hung, nor any business be conducted over or in any street or public place, or where it or particles therefrom or set in motion thereby will pass into any such street or public place, or into any occupied premises; that neither any usual nor any reasonable precaution shall be omitted by any person to prevent fragments or other substances from falling to the peril of life, or dust and light material flying into any street, place or building, from any building or erection while the same is being altered, repaired or demolished or otherwise."[3]

"No person shall carry or convey in any vehicle any earth, sand, gravel, dirt, ashes, or any loose fluid or offensive articles or matter, or any articles whatsoever, so that the same shall or may be scattered, dropped, let fall, blown, or spilled therefrom, and all vehicles conveying foul, dusty or offensive matter of any sort shall have tight bodies and be closely and securely covered."[4]

The cleaning of fish in the street is commonly forbidden, and also the dropping of any refuse from the wagons of venders of any kind of produce and meats:

"No person shall clean, scale, or wash any fish, meat, clothes, carriage, buggy, or any other thing tending to create a nuisance, on any of the streets, lanes, alleys, public grounds, or markets of the city."[5]

One prolific source of nuisance in streets is the obstruction of gutters by which filthy water accumulates after every rain, and in warm weather often becomes very offensive. Hence special rules forbidding such obstruction:

"That no person shall deposit on any street, alley, private or public place in the limits of the city, or upon any paved street now or hereafter constructed, any dirt,

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[1] Atlanta Sanitary Rules and Regulations, Sec. [illegible].

[2] Boston Ordinances 1890, Chapter 4[illegible], Sec. [illegible].

[3] [illegible] Ordinances 1881, Sec. 1387.

[4] District of Columbia Police Regulations, Chapter 8, Sec. 1[illegible].

[5] Cleveland Ordinances 1892, Chapter [illegible], Sec. 714.

brick or other material, in such manner as to obstruct the free water flow of water along any ditch or gutter."[1]

In case gutters should become obstructed, provision is made in some cities, as Baltimore, Camden, and Jersey City, for the abutters to keep the gutters in front of their estates free from obstructions:

"No person shall throw, place or deposit, or allow to collect on or run over any sidewalk, street, road or alley, any slops, dirty water or filth of any kind; and every person shall keep the gutter in front of his or her premises, occupied as store, factory, dwelling or other building, free from filth, dirt or other obstructions; and every person offending against the provisions of this section shall forfeit and pay a penalty of ten dollars."[2]

In other cities, as Baltimore, Cleveland, Memphis, Newark, Rochester, St. Louis, and Wilmington, Del., this provision for cleaning by abutters extends to the sidewalks and sometimes includes a portion of the street:

"The owners or agents or occupiers of tenements and vacant lots owned by them, under their charge or occupied by them, shall keep the sidewalks and gutters in front of and adjoining their property clean, and also all the private alleys in the rear of or adjoining the property owned by them clean to the center of such alley, and after any fall of snow to be immediately removed from the sidewalk fronting their respective lots into the carriage way of the street. Any person failing to comply with the requirements of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than five nor more than twenty dollars."[3]

In Memphis and the District of Columbia the gutters must be cleaned daily between the first of May and the first of December. In New York the abutters are only required to keep the sidewalks clean. On the other hand in Memphis the abutter is required to clean four feet into the street in all cases.

The condition of private alleys is in many if not most cities a constant annoyance to the board of health. Most cities clean all their public highways at public expense either by their own employees or by contract; but the municipality cannot thus directly cleanse private ways without becoming permanently responsible for their condition. Moreover, the city in many cases does not care to expend its money in the cleaning up of what is really private property. The plat owners, not the abutters, are the real owners, and hence it is claimed by some that the city cannot compel the abutters to clean the alley. But, as is shown above, the ordinances of Memphis and St. Louis require the partial cleansing of alleys, and in Boston and Haverhill the cleansing is required by the following:

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[1] Denver, Ordinance 44 of 1893, Sec. 78.

[2] Camden, Sanitary Code (1894), Sec. 21.

[3] St. Louis, Ordinances (1893), Chapter 14, Sec. 374.

"No owner or occupant of land abutting on a private passageway and having the right to use such passageway shall suffer any filth, or waste, or stagnant water to remain on that part of the passageway adjoining such land." [1]

In Baltimore if the abutter does not keep the alley clean or if he does not clean it when ordered the city cleans it and charges the cost to the estate. This is done under the ordinances and has been sustained by the courts. Private alleys are treated in a similar way in the District of Columbia. Alleys can be and are kept cleaner if they are paved and several cities provide for the paving of private alleys. In Wilmington, Delaware, it is done under the following ordinance which is sustained by the courts, at least the municipal court:

"The board of health shall have power to order the paving of any alley, court, yard or street, not owned by the city; *provided*, that two members of the board shall declare such a course necessary for the preservation of the health of the neighborhood; and if the order of the said board be not executed within the required time, said board shall have authority to have the paving done, and to collect the expenses thereof *pro rata*, from the parties owning or using such alley, court, yard or street." [2]

In Reading whenever a private alley is offensive and a nuisance, and needs paving, the following order is issued under the authority granted by Chapter 257, of 1874, Sec. 49, which gives cities of the third class authority to abate nuisances:

"RESOLVED, That the ten-feet-wide alley running..... and .....between..... .....streets, is hereby declared a nuisance, and the health commissioner is instructed to notify the owners of property abutting thereon, to abate said nuisance within..... ..... days from date, on failure of which he is instructed and hereby authorized to have the said alley cleaned and paved, and to proceed to recover the costs thereof from the owners of property abutting thereon."

This is served on the abutters. If they do not pave the alley the city does, and bills are sent to the abutters for the cost. These are generally paid, but if not are sued for, and the courts have always sustained the position taken by the city. A number of alleys are treated in this way every year, the number in 1899 being twelve. Previous to 1898 the board of health of Boston had authority[3] to order private alleys paved and drained at the expense of the abutters. But in 1898[4] the authority to lay out and construct alleys as highways was conferred upon the board of street commissioners. Under this law the assessments are to be made as for highways, but the city is not to be liable for defects or for cleaning off the snow.

[1] Boston, Ordinances (1890), Chapter 49, Sec. 25.

[2] Wilmington, Health Ordinance, Sec. 9.

[3] Massachusetts, Chapter 323 of 1891.

[4] Massachusetts, Chapter 298 of 1898.

In some streets the gutters are flushed with water to cleanse them, and even the streets themselves are occasionally washed, and Chicago, New York, Buffalo, and Memphis require that the excess of dirt be removed before the water is applied:

"That every person, when cleaning any street, shall clean, and every contractor shall cause to be cleaned, the gutters and parts of the street along which the water will run, before using any water to wash the same; and no substance that could be before scraped away shall be washed or allowed to be carried or be put into the sewer, or into any receptacle therewith connected.[1]

Drainage.

Defects in plumbing and drainage are frequently sources of nuisance and sometimes also are causes of disease. In order to guard against such mishaps it is first of all desirable that all work of this kind should be done in the best possible way, and at the present time most cities and many small towns require a rigid inspection of all new work; but the plumbing rules, as they are called, usually apply only to work constructed after the date of enactment. The future is thus provided for, but other regulations, usually less stringent, are often made to prevent or remedy the grosser and more dangerous defects that may be found in old work.

The following are some of the requirements found in various cities:

Drains Required.

"No person shall discharge any waste water or water from a sink or water-closet except through a drain into a sewer or cesspool, or in accordance with a permit from the board of health."[2]

Drain Must be Adequate.

"That it shall be the duty of every person using, making, or having any drain, soil-pipe, passage or connection between any sewer (or with either the North or East rivers) and any ground, building, erection, or place of business, and in like manner the duty of the owner and tenant of all grounds, buildings, and erections, and of the parties interested in such place of business or the business thereat, and in like manner the duty of all boards, departments, officers and persons (to the extent of the right and authority of each), to cause and require that such drain, soil-pipe, passage, and connection, shall at all times be adequate for its purpose, and shall convey and allow, freely and entirely, to pass whatever enters or should enter the same, and no change of the drainage, sewerage, or the sewer connection of any house or premises, involving changes in the drainage, sewerage, or sewer connection of any other house or premises, unless notice of at least thirty days in writing thereof shall have been previously given to this Department.[3]

Drain Must not Leak.

"No person shall suffer any particular drain from any building or land, of which he is the owner or occupant, to leak or be out of repair; nor shall any person suffer

[1] The City of New York, Sanitary Code (1899), Sec. 28.
Boston, Ordinances (1890), Chapter 49, Sec. 26.

[3] City of New York, Sanitary Code (1899), Sec. 30.

sewage, or waste or stagnant water, to remain in any building, or upon any land of which he is the owner or occupant." [1]

Drains, Construction of Trap, etc.

"No owner, occupant, tenant or agent shall construct or cause to be constructed, or maintain any drain or any portion thereof, to connect with any main drain or common sewer, except the same first-mentioned drain if passing under buildings to be used as habitable places, be made of iron pipe, and every such drain shall be so trapped and secured as to prevent the escape therefrom of any offensive odor and poisonous matter.

"All sewers or drains that pass within fifty feet of any source of water used for drinking or culinary purposes shall be water-tight." [2]

Drains not to be Obstructed.

"Whenever a water-closet, vault, privy, cesspool, or drain becomes offensive or obstructed, the same shall be cleansed and made free, and the owner, agent, occupant, or other person having charge of the premises on which any water-closet, vault, privy, or drain is situated, shall remove, cleanse, alter, amend, or repair the same within such time after notice in writing to that effect given by the board of health as shall be expressed in such notice." [3]

Strainer Required.

"In all cases where a drain shall be made from any lot, house, or other property into a public sewer constructed by this corporation, there shall be a good and sufficient copper or cast-iron strainer inside of the basement or cellar wall of the property so drained, to prevent any vegetable matter or filth in a solid state from passing into the sewer, and such cellar or basement shall at all times be subject to the inspection of such person as may be authorized by the mayor or corporation to examine the same; and if at any time the strainer shall be found worn out or choked with filth, or if the drain itself shall be choked with filth, the owner or occupier of the premises, either or both of them, shall be fined not less than five dollars nor more than ten dollars for the first offense, and not less than ten nor more than twenty dollars for the second or any subsequent offense, and five dollars for every twenty-four hours during which the strainer or drain shall remain out of repair or be choked up, the said fines to be recovered as other fines of this corporation are recovered." [4]

Plumbing.

Defective Plumbing.

"No foul or leaking waste, soil, vent, or drain pipe shall be constructed or allowed to remain in any occupied or inhabited building in Denver. To ascertain the sanitary condition of the plumbing and draining in any building the health commissioner may at any time cause such tests to be applied to it as are demanded by ordinance No. 23 of the series of 1892.

"Whenever any plumbing fixtures in any building are condemned by the plumbing inspector of the bureau of health on account of their foul, unwholesome or imperfect condition, they shall be replaced by such apparatus as is demanded by the said plumbing ordinance No. 23 of the series of 1892.

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[1] Boston, Ordinances (1890), Chapter 49, Sec. 27.

[2] Albany, Sanitary Ordinances (1892), Secs. 16–17.

[3] Cambridge, Regulations of Board of Health (1894), Sec. 34.

[4] District of Columbia, Webb's Digest, p. 358, Sec. 5.

"When the plumbing in any building is altered or reconstructed by order of the health commissioner, the said commissioner is authorized to modify the requirements for the construction of plumbing as provided in said plumbing ordinance No. 23, series of 1892; provided, however, that in no case shall plumbing be permitted to remain which, after thorough tests have been applied, may be found to be in unsanitary condition." [1]

Traps Required for Fixtures.

"All sinks, basins and stationary tubs in every hotel, lodging, tenement, boarding-house, or other dwelling in the city of St. Louis, shall be provided with proper stench traps, directly under each sink, basin or stationary tub so connected with waste or soil pipe, and so constructed as directed by the health commissioner, approved by the board of health, and with the traps so adjusted as to prevent the escape therefrom of foul odors and gases." [2]

Ventilation of Soil and Waste Pipes.

"No person shall have for use or use any water-closet, urinal, sink, tub or other structure or appliance for receiving, holding or carrying away animal excrement, or refuse from domestic uses, or any pipe or pipes used in house draining; unless each of the same shall be freely ventilated by appliances sufficient to allow the escape of all gases, and to avoid the compression or tension of the air confined in such pipes or drains.

"The owner of every dwelling house in said city, having a waste or soil pipe placed therein, shall cause the same to be ventilated by extending the same by means of a pipe of the same size to a height of not less than two feet above the roof of the building, or pursuant to the terms of a permit in writing from the board of health." [3]

Sewer Connection from Hydrants.

"All persons using city water from hydrants located upon their premises, be, and they are hereby required to connect drains from the same with the public sewers, where such sewers are laid in the street adjoining their premises; and they are also forbidden to allow waste water to run from their premises upon the sidewalks or street." [4]

Sufficient Water for Water-closets.

"SEC. 112. That all water-closets now, or hereafter, having sewer connections, shall also have proper water connection with the city water-works, or from private windmills or water-works, where there is an ample flow of water, and all said water-closets shall be so flushed with water, of sufficient flow and strength, as will prevent the accumulation of offensive matter, and will safely and promptly carry off the same into the sewers." [5]

Obstruction of Water-closets, Vaults, etc.

The deposit of improper substances in water-closets and privy vaults is forbidden in many cities. The following is the ordinance in Cleveland:

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[1] Denver, Ordinance 44 of 1893, Secs. 128, 130, 132.

[2] St. Louis, Ordinances (1893), Chapter 14, Sec. 406.

[3] Yonkers, Sanitary Code (1892), Secs. 39 and 42.

[4] Fall River, Regulations of Board of Health (1894), Sec. 21.

[5] Atlanta, Sanitary Ordinances, Sec. 112.

"No person shall throw into or deposit in any water or privy closet, vault, sink, privy, or cesspool, any offal, ashes, garbage, swill or other substance, except that of which any such place is the appropriate receptacle, and the owner, lessee, agent, tenant, occupant, or other person having control of any building or premises to to which such water or privy closet, vault, sink, privy or cesspool appertains, shall be considered and held responsible for any violation of this section."[1]

In Providence a card giving notice of a similar regulation is furnished by the health department without charge. This card is 7 by 14 inches and reads as follows:

"NOTICE TO TENANTS.

Any person who places any ashes, sticks, stones, rags, broken crockery, or anything else in this closet which may cause it to become obstructed, is liable to a fine of $20.

Per order of the

SUPERINTENDENT OF HEALTH."

Water-closet Construction.

"No water-eloset shall be allowed to be placed or maintained in any part of a building where there cannot be a direct communication between the room in which it is situated and the outer air, and all such water-closets shall be required to be directly ventilated into the outer air. No water-closet shall be allowed to be placed or maintained in any situation where its trap shall be at a lower level than the water in the harbor at mean high tide."[2]

Urinals.

"No person shall mar, misuse, defile, or deface a public urinal, nor attach thereto any hand-bill, advertisement, or drawing."[3]

Cellars.

Other matters than plumbing and drainage which may affect the sanitary condition of dwellings and cause them to become nuisances or unhealthful, are often regulated by sanitary ordinance. The construction and use of cellars is one of these matters. The New York rule provides

"That no owner or lessee of any building, or any part thereof, shall lease or let, or hire out the same or any portion thereof, to be occupied by any person, or allow the same to be occupied, as a place in which, or for any one, to dwell or lodge, except when said buildings or such parts thereof are sufficiently lighted, ventilated, provided and accommodated, and are in all respects in that condition of cleanliness and wholesomeness, for which this Code or any law of this State provides, or in which they or either of them require any such premises to be kept. Nor shall any such person rent, let, hire out, or allow, having power to prevent the same to be used as or for a place of sleeping or residence, any portion or apartment of any building, which apartment or portion has not at least two feet of its height and space above the level of every part of the sidewalk and curbstone of any adjacent street, nor of which the floor is damp by reason of water from the ground, or which is

[1] Cleveland, Ordinances (1892), Chapter 30, Sec. 480.

[2] Bridgeport, Ordinance of 21 September, 1892, Sec. 23.

[3] Boston, Ordinances (1890), Chapter 49, Sec. 11.

impregnated or penetrated by any offensive gas, smell, or exhalation prejudicial to health. But this section shall not prevent the leasing, renting, or occupancy of cellars or rooms less elevated than aforesaid, and as a part of any building rented or let, when they are not let or intended to be occupied or used by any person as a sleeping apartment, or as a principal or sole dwelling apartment.

"That no person having the right and power to prevent the same, shall knowingly cause or permit any person to sleep or remain in any cellar, or in any bath-room, or in any room where there is a water-closet, or in any place dangerous or prejudicial to life or health, by reason of a want of ventilation or drainage, or by reason of the presence of any poisonous, noxious, or offensive substance, or otherwise." [1]

Another specific provision is that cellars must be ventilated and dry:

"All cellars must be properly ventilated to keep them dry and healthful; and no stagnant water or filth, of any kind, will be allowed to remain on any vacant land, or under any building, thereby causing a nuisance."[2]

"Whenever any cellar, basement or part thereof, or any house or building within the limits of the city of Omaha, shall be found to be damp or moist by reason of leaking or defective hydrants, water pipes, sewer pipes, cisterns or wells, gutters, drains, rain spouts, or seepage from the surrounding earth, or from a deposit of any kind or nature, or from any cause whatever, shall become detrimental to health, the same shall be deemed a nuisance."[3]

Other provisions relating to cellars are found in the charter of the City of New York,[4] and also in the ordinances of a number of other cities, as Buffalo, Paterson, and Philadelphia. In the latter city cellar tenements lighted only by a door, or cellars without a board floor, must be vacated in five days.

Roofs Must be Tight.

"The roof of every house shall be kept in good repair and so as not to leak, and all rain water shall be so drained or conveyed therefrom as to prevent its dripping on the ground, or causing dampness in the walls, yard or area."[5]

Fresh Air Inlets.

"In all dwellings or other buildings heated by furnaces the fresh air duct shall receive its supply of air from outside the building, and entrance to such air duct shall, when possible, be raised above the surface of the ground in such a way as to exclude the entrance of filth."[6]

Gas not to be Cut off.

"From and after the passage of this ordinance, it shall not be lawful for the proprietor or proprietors (either themselves or by their employees) of any hotel or

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[1] City of New York, Sanitary Code (1899), Secs. 22–23.

[2] Fall River, Regulations of Board of Health (1894), Sec. 50.

[3] Omaha, Rules and Regulations of the Department of Health (1892), Sec. 60.

[4] New York, Chapter 378 of 1897, Secs. 1309–10.

[5] Chicago, Ordinances (1881), Sec. 1359.

[6] Denver, Ordinance 44 of 1893, Sec. 148.

boarding house in the city of Atlanta, where any kind of gas is used in bed-rooms for lights, to cut the gas off at any time during the night, except in cases where the premises may be on fire." [1]

Overcrowding.

Overcrowding is one of the chief causes of the spread of communicable disease and the conditions which are attendant upon and inseparably connected with the huddling together of human beings are conducive to many other forms of disease. It is only by the most careful attention to every sanitary detail that persons can live closely packed together without suffering great physical deterioration. And the immoral effects of crowding are so marked and the tendency induced so degrading, that any efficient control of densely packed tenements is almost impossible. Hence it is felt that limits must be placed upon the concentration of population to which their poverty is always impelling the poorer classes. One means of checking overcrowding is by the vacation of premises which are found on this account to be a menace, not only to the health of the occupants, but to that of the public as well. This vacation as we have seen has been provided for by statute in many states. These statutes are usually to be enforced by local boards of health. In some cases, as in Holyoke, Lynn, and Newton, the degree of overcrowding which will there require the application of the statute is fixed by a rule of the local board of health:

"In considering the number of occupants, in accordance with the foregoing section, this board will consider a sleeping room to be overcrowded unless there should be at least four hundred (400) cubic feet of air space for each inhabitant occupying the same." [2]

In Newton, Mass., the space required is 500 cubic feet.

As we have seen, many cities in states where there is no statute law to vacate houses nevertheless incorporate such provisions in their local rules, and sometimes, as in Lynn, the degree of crowding permissible is specified. The following is from Denver:

"In every lodging house, tenement house, hotel, factory, workshop, theatre, assembly hall, office or other building or room where human beings sleep, dwell, congregate or labor, the lighting, ventilation or breathing space shall be sufficient for the preservation of health. To prevent overcrowding, the occupants or visitors of such premises shall be so limited in number that not less than 700 cubic feet of air space, with sufficient means for its frequent renewal shall be provided for each person." [3]

But in New York the rules in regard to tenement houses provide that there shall be 400 cubic feet of air space for each adult and 200 for each child.

[1] Atlanta, Sanitary Ordinances, Sec. 142.

[2] Lynn, Regulations of Board of Health, 1894, Rule 22.

[3] Denver, Ordinances of 1893, Sec. 143.

There are many other ordinances in regard to the sanitary conditions of dwellings and other structures, many of them of a very general nature and intended to cover any and all dangerous defects which may occur, but which cannot from their great variety be all specifically provided for by separate enactments. One of these regulations is here given. See also section 22 of the same code, shown on page 152:

"That no person shall hereafter erect, or cause to be erected, or converted to a new purpose by alteration, any building or structure, or change the construction of any part of any building by addition or otherwise, so that it, or any part thereof, shall be inadequate or defective in respect to strength, ventilation, light, sewerage, or of any other usual, proper, or necessary provision or precaution for the security of life and health; and no person shall make or use a smoke house or room or apparatus for smoking meat, in any tenement or lodging-house, without a permit in writing from the board of health, and subject to the conditions thereof; nor shall the builder, lessee, tenant or occupant of any such, or of any other building or structure, cause or allow any matter or thing to be or to be done in or about any such building or structure dangerous or prejudicial to life or health."[1]

The sanitary condition of schools, factories and tenements and the laws regarding them will be considered in another connection.

There are a number of things which may at times become nuisances or injurious to health, but which are not usually noticed in sanitary regulations. In most extensive sets of sanitary rules some few of these unimportant or unusual matters are treated of. The following are examples of some of them:

Upturning the Soil.

In Augusta, Ga., Charleston, New Orleans, and Savannah and by the rules of the Florida state board of health, the upturning of dirt or soil in large quantities is prohibited from the first of May to the first of November without the written permission of the board of health or mayor. The following is the ordinance in Charleston:[2]

"It shall not be lawful to dig up, open; or disturb the surface of the earth, within the limits of the city, between the first day of June and the first day of October, in any year, for the purpose of paving the streets, of excavating for drains, of laying down gas or other pipes, or of carrying on any other public improvement; Provided that any incorporated company, or their agent or agents, may with the consent of the mayor at any time during the year, lay down service pipes in any street, lane, or alley of the city, in which main pipes have been already laid; upon the express condition and proviso, however, that between the first day of June and the first day of October, in every year, each piece of service pipe shall be laid, and the earth and pavement restored, during the day in which the surface of any street, lane or alley is opened for the aforesaid purpose."

The board of health in New Orleans after a careful investigation of the subject has decided that little, if any harm is caused by such excavations and it puts little restriction on them.[3]

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[1] City of New York, Sanitary Code (1899), Sec. 21.

[2] Charleston, Ordinances (1897), Sec. 154.

[3] New Orleans, Report of Board of Health 1898–9, p. 13.

Weeds.

Rules in regard to weeds are also found in Columbus, the District of Columbia, Denver, St. Louis, and Wilmington, and in Iowa the code provides that cities and towns may destroy weeds in lots.[1] The St. Louis ordinance assesses the cost on the property, but owing to the expense and delay of procedure when nuisances are owned by non-residents, as about half the vacant lots are, the health commissioner of that city does not attempt to enforce the ordinance.

In Columbus the ordinance is similar to that of St. Louis, and in 1898 $1,700 was expended in clearing lots of weeds. A case was brought to test the law, but has not yet been decided.

In Charleston[2] persons having charge of burial grounds shall cause "rank and offensive weeds" to be pulled up every fortnight and placed in the street for the scavengers to remove and "also to cause the grass which may be growing on such burial ground or church yard to be removed or cut, and taken away as often as in the opinion of the board of health the growth thereof may be so rank and luxurious as to endanger the health of the city."

Cabbage Plants.

"That no cabbage head, cabbage stalk or other portion of any cabbage plant shall be allowed to remain upon any garden, field or open space within the City of Chicago, between the 15th day of October, in any year, and the 15th day of April next thereafter following, unless the same shall be covered under at least one foot of earth."[3]

Poisonous Plants.

The following is from Providence, and occasion for its application not infrequently arises:

"The owner or occupant of any land upon which there is any poisonous ivy or any Jamestown or Jimson weed, within fifty feet of any highway or street, shall cause such ivy or weed to be removed within five days after receiving notice so to do from the superintendent of health."[4]

Ailantus Trees.

These are often a nuisance and have been so declared in the District of Columbia and New Haven:

"That ailantus trees, the flowers of which produce offensive and noxious odors, in bloom, in the cities of Washington and Georgetown, or the more densely popu-

[1] Iowa, Code (1897), Sec. 696.

[2] Charleston, Ordinances (1897), Sec. 128.

[3] Chicago, Manual of Health Department (1891), p. 77.

[4] Providence, Ordinances (1900), Chapter 19, Sec. 12.

lated suburbs of said cities, are hereby declared nuisances injurious to health; and any person maintaining such nuisance, who shall fail, after due notice from this board, to abate the same, shall, upon conviction, be fined not less than five nor more than ten dollars for every such offense." [1]

Closets of Railroad Coaches.

Unless care is taken the water-closets of railroad coaches become a nuisance about stations if the closets are used while the trains are approaching or standing at the stations. This matter is usually looked after by the railroad officials, but at least one city, Atlanta, has a rule in regard to it.

Street Cars.

The following rules have been in force in New York City for a number of years:

"That no railroad car, or vehicle constructed for or engaged in the business of carrying passengers on any line of railroad in the City of New York, and which car is propelled by horse-power, and not by steam-power, shall be used with cushions on the seats or on the backs of the seats thereof.

"That each and every car used upon any railroad in the City of New York for the carrying or transportation of passengers, shall on each and every day on which it may be used for the carrying or transportation of passengers, be carefully and thoroughly washed out and cleaned, so that all filth and dirt are removed from the inside of said car. And no dirt, sand, ashes or other similar substance shall be deposited by any person operating a railroad or stage line in the City of New York upon the surface of any paved street in said city without a permit from this department.

"That no person shall at any time carry or convey in or upon any passenger railroad car, nor shall any conductor or person in charge of any such railroad car allow to be carried or conveyed in or upon such car, except on the front platform, any soiled or dirty articles of clothing or bedding, in baskets or bundles.

"That every car used for the transportation of passengers in the City of New York, shall be so constructed as at all times to provide and secure good ventilation.

"Every company, corporation or person operating a line of railroad cars for the carriage of passengers for hire in the City of New York, shall, in connection with the running and operation of cars as aforesaid, have and provide closed cars to be run on said railroad; and at all times shall have, provide, and operate at least one closed car in every four cars so operated and run for the carriage of passengers as aforesaid." [2]

Salt in Streets.

"No person shall sprinkle, scatter, or put upon the rails, switches, or other appliances of a street railway in any street, any salt, or mixture of salt, except in accordance with a permit from the board of health." [3]

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[1] District of Columbia, Act of 19 November, 1895, Sec. 8.

[2] New York, Sanitary Code (1899), Secs. 184–188.

[3] Boston, Ordinances (1890), Chapter 49, Sec. 10.

Noises.

Disturbing noises are certainly a nuisance, if not a direct and appreciable injury to health. The activities of modern life are constantly increasing the volume of city noises, and some of our leading medical journals are urging the necessity of taking some steps to lessen it. It is claimed that the constant irritation of the nerves produces a very appreciable effect in bringing on that nervous exhaustion, which is the end of many a busy man's career. Attempts to control noises are not only seen in general police regulations, but they are often found among sanitary regulations. Rules in regard to noisy animals are referred to on pages 162 and 170. In Boston[1] "No church bell shall be rung to disturb any sick person if forbidden by the board of health." A former Brooklyn[2] rule was as follows:

"That no person owning or occupying any building or premises shall use the same, or permit the use of the same, or rent the same to be used for any business or employment, or for any purpose of pleasure or recreation, if such use shall, from its boisterous nature, disturb or destroy the peace of the neighborhood in which said building or premises are situated, or be dangerous or detrimental to health."

In Meadville, Pa., bells and whistles are stopped by the board of health on a physician's certificate that a sick person's condition demands it.

Roping off Streets in Sickness.

By an order of the Commissioners of the District of Columbia of 23 August, 1883, the health department issues permits to prevent the the passage of vehicles in neighborhoods where persons are so seriously ill as to make such a step necessary. In 1899 sixty-one such permits were issued, but the health officer does not think such an ordinance is required and urges its repeal.[3]

Spitting.

The first anti-spitting law in the United States was adopted 12 May, 1896, in New York City, at the suggestion of Drs. Biggs and Prudden.[4] It was adopted for the purpose of diminishing the spread of tuberculosis. It had been shown that tubercle bacilli are thrown off in large numbers in the sputum of many cases of phthisis, and that this sputum when it becomes dry on the floor or sidewalk would be readily pulverized and carried about by air currents, and might on reaching the air passages of those who breathed this dust-laden air, cause the disease in them. This danger was believed to be a very real one, and

[1] Boston, Ordinances (1890), Chapter 49, Sec. 12.

[2] Brooklyn, Sanitary Code (1895), Sec. 179.

[3] District of Columbia, Report of Health Officer (1897), p. 26.

[4] New York City, Report of Board of Health (1896), p. 29.

hence the ordinance. While the evidence in support of the view that this danger is great enough of itself to warrant such legislation is not entirely satisfactory, the legislation itself has met with very general approval. Spitting on the floor or sidewalk is a dirty habit, creates a nuisance, and is annoying to the majority of persons. It is probably because it prevents nuisance rather than because it prevents disease that the law meets with popular favor. It is, however, usually adopted by boards of health under authority to legislate for the prevention of disease.

At present such regulations are found in the cities named below,[1] but have not yet been incorporated into statute law; but in Indiana they have been promulgated as rules of the state board of health.

Some of the regulations, especially the earlier ones, forbade spitting in street cars only, as in Baltimore, Minneapolis, Lowell, Lynn, Boston, Cambridge, and New Orleans.

"RESOLVED, That the deposit of sputum in street cars is a public nuisance, source of filth and cause of sickness, and hereby orders: That spitting upon any floor of any street car be, and hereby is prohibited."[2]

The word spit has in most of the regulations been deemed sufficient to describe the act which it is desired to prohibit, but it has been further explained in some cities. It has furthermore been found insufficient to forbid spitting on the floor, and it has been said that persons seeing the rule above given exhibited before them, have deliberately spat upon some other portion of the car. The Minneapolis rule takes note of both these points:

"No person shall spit or expectorate, or deposit or place any sputum, saliva, phlegm, or mucus upon the floor or inside furnishings or equipments or in any place upon the outside, or upon any platform of any street car while the same is in use upon any of the streets or highways in the City of Minneapolis, or in any manner defile or pollute the floor, furnishings, equipments or platform of any street car while in use upon any of the streets or highways of said city."[3]

Most of the more recent rules forbid spitting in any "public conveyance." Among the conveyances mentioned are "street cars," "railroad cars," "ferry boat," "omnibus," "hack," "carriage," "vehicle," "steam car," and "steamboat."

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[1] Boston, Baltimore, Buffalo, Brookline, Cambridge, Colorado Springs, Columbus, Cleveland, Cincinnati, Camden, Denver, Dayton, Fitchburg, Fall River, Hartford, Indianapolis, Jersey City, Kansas City, Louisville, Lowell, Lynn, Minneapolis, New York, New Orleans, Omaha, Peoria, Ill., Rochester, Springfield, O., Salem, San Francisco, Scranton, Seattle, Trenton, Waltham, Worcester, and Washington, D. C.

[2] Lowell, Report of Board of Health, (1898), p. 36.

[3] Minneapolis, Ordinance of 25 June, 1897, Sec. 53.

A good many of the rules go further and prohibit spitting on the floor of "public buildings," as in New York City. Among public places mentioned are "public halls," "assembly rooms," "shops," "stores," "halls," "churches," "school houses," "railroad stations," "public places." The Indiana rules forbid spitting on stairways. Some of the rules go further still and forbid spitting upon the sidewalk, as in the present rule in Boston, Cambridge, and Lynn, and in Cincinnati, Providence, Brookline, Mass., Springfield, Mass., Colorado Springs, and Rochester:

"ORDERED, That no person shall spit upon the floor of any public conveyance, shop, store, hall, church, school house, railroad station, or other public building in said town, or upon the steps of any of said conveyances or buildings, or upon the sidewalk (spitting into the gutter or street is not forbidden) of any public way in said town.[1]

These rules have very generally met the approval of the street railway and other transportation companies, and they have been very ready to post notices containing the rule, and to assist in its enforcement. Some of the rules however, provide that the companies shall do this:

"Spitting upon the floors of public buildings and of railroad cars and of ferry boats is hereby forbidden, and officers in charge or control of all such buildings, cars and boats shall keep posted permanently in each public building and in each railroad car and in each ferry boat a sufficient number of notices forbidding spitting upon the floors, and janitors of buildings, conductors of cars and employes upon ferry boats shall call the attention of all violators of this ordinance to such notices."[2]

In Providence the street railway company not only posted such notices in its cars, but furnished its conductors with slips on which was printed the rule, and the conductors were directed to hand one of the slips to every person seen violating the rule. In Minneapolis cards containing the rule are printed and very generally distributed by the board of health. In Brookline where spitting on the sidewalk is forbidden, the police carry copies of the law to show to offenders.

In order to render compliance with this rule easier, it is provided in Colorado Springs as follows:

"Every owner, agent, lessee or occupant of any public hall or building shall provide the same with cuspidors in sufficient number to accommodate the necessities thereof. And any such owner, agent, lessee or occupant who shall refuse or neglect to comply with any order of the health officer in supplying said cuspidors, shall be fined in a sum not less than one dollar nor more than five dollars for each offense." [3]

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[1] Brookline, Mass., Report of Board of Health (1898), p. 10, Orders of the Board of Health, No. 16.

[2] New York City, Sanitary Code (1899), Sec. 194.

[3] Colorado Springs, Sanitary Code (1897), Sec. 60.

In New Orleans the rule first adopted only forbade spitting tobacco on street cars, but it has been recently modified to forbid all spitting.

Stables.

The keeping of horses, swine, cattle, and other domestic animals, can readily be done in the country without nuisance or damage to any one, but as soon as any locality becomes so well occupied that the stables, sheds, and pens in which these animals are kept must of necessity be near the doors and windows of neighbors, then trouble begins. In villages, towns, and cities the keeping of horses and the storing and disposal of stable manure is always a problem which health officers have to solve. The regulation of such matters well comes within the limits of the general sanitary powers of local government, but at least two states furnish a special statute on this subject. The Massachusetts act was first passed in 1891, but was amended in 1896 to read as follows: [1]

"No person shall hereafter erect, occupy, or use for a stable any building in any city whose population exceeds 5,000, unless first licensed to do so by the board of health of said city and in such case only to the extent so licensed."

The location of stables is sometimes limited by statute or ordinance. Thus in Boston a statute[2] provides that no livery stable shall be erected within 170 feet of a church without the written consent of the proprietors and the permission of the board of health. By a more recent act[3] this provision applies to all cities, only the distance is made 200 feet and the permit must be from the religious society or parish. In Chicago[4] no livery stable can be built or kept on any residential street within seventy-five feet of the street without the written consent of the owners of 600 feet of property on each side of the lot. In Cincinnati and Cleveland[5] a written application must be made to the board of health for a livery stable license giving full particulars, and on residence streets license is not to be granted without written consent of owners of dwellings within 300 feet.

In most of the Massachusetts cities persons desiring to erect a stable have to make a written application, and in Fitchburg there must also be filed a plan and description of the stable. A printed notice is then sent to the applicant explaining the rules that must be followed in the construction of the stable. The license is not issued until the satis-

[1] Massachusetts, Chapter 332 of 1896, also see Chapter 428 of 1897.

[2] Massachusetts, Chapter 124 of 1810.

[3] Massachusetts, Chapter 220 of 1891.

[4] Chicago, Ordinances (1891), Sec. 2241.

[5] Ohio, Annotated Statutes (1900), Secs. (2672-26), (-84), (-104), (-112).

factory completion of the building. In Newton, Mass., as soon as an application to erect a stable is received, notices are mailed to owners of adjoining property, and such notices are also posted in the vicinity. Four days are allowed for filing written objections with the board of health. If no objections are filed, the clerk issues a provisional permit. In Providence stables are licensed by the board of aldermen. When a petition is received, it is referred to the alderman of the ward in which the stable is to be built, and the board usually accepts his report and grants the license without conditions.

The majority of cities have as their first rule a requirement that stables shall be kept clean. Various other matters, as construction of stable, care and removal of manure, and its disposal, commonly receive attention. The following are examples of rules commonly in force:

Cleanliness Prescribed.

"The keeper or keepers of a livery or other stable shall keep his or their stables and stable yard clean."[1]

Noise Must Not Disturb Neighborhood.

"No person owning, occupying, or having charge of any building, stable, or other premises, shall keep or allow thereon or therein any animals or birds, which shall by noise disturb the quiet or repose of those, or anyone, therein or in the vicinity, to the detriment of the life or health of any human being. Any violations of the provisions of this section shall be punishable by a penalty of twenty-five dollars."[2]

Floor to be Impervious.

"Every stable or building which may be hereafter constructed or reconstructed in the city of Asbury Park, in which any horse, mule, or cow is kept or stabled, shall be so constructed and drained that no fluid excrement or refuse liquids shall flow upon or into the ground. All of the surface of the ground beneath every stall in every such building, and for a distance of at least four feet in the rear of every such stall shall be covered and protected from pollution, by a water-tight floor or covering which shall be constructed as follows:

"Where the said water-tight covering rests directly upon the ground surface, the said covering shall consist of concrete made with finely broken stone, one part; sharp sand, one part; hydraulic cement, one part; or coarse gravel, two parts; hydraulic cement, one part; to be laid at least three inches in thickness. Upon this concrete foundation a layer, at least two inches in thickness of best asphalt: or a layer, at least two inches in thickness of coal tar concrete; or a layer, at least two inches in thickness of cement concrete made with sharp sand, one part; best Imperial Portland cement, one part, shall be laid.

"When the water-tight covering is not in contact with the surface of the ground, it shall rest upon joist or floor beams three inches by ten inches, laid twelve inches from centres, and it shall consist of spruce or yellow pine planking, three inches thick and three inches wide, with beveled edges, and it shall be closely laid so that the joints shall be V shaped, and be open at the top one quarter of one inch. Said

[1] Scranton, Rules of Board of Health, Sec. 9.

[2] Albany, Ordinances (1892), Sec. 18.

joints shall be calked with oakum and be made water-tight. Every such water-tight covering shall be laid upon a grade not less than one-eighth of one inch to each foot, and shall be so drained that all fluids which may fall upon it will be conveyed to a street sewer or otherwise disposed of subject to the terms of a permit from this board. Portable wooden racks shall be placed upon all such asphalt, coal tar, concrete or cement concrete floors within said stall. Said wooden racks or floor coverings shall be constructed of spruce strips, two inches in thickness, made in two sections, and they shall be so placed that they may be readily removed for cleaning." [1]

The Asbury Park rule has since been declared void by the supreme court of New Jersey. The point made was that it was beyond the power of the board of health to prescribe in what way the floor should be made tight. Nevertheless in a majority of existing rules the method is thus prescribed.

Receptacle for Manure.

In very many cities a pit, bin, or cellar is required for the manure:

"Every person owning, leasing or occupying any stall, stable, shed, barn or apartment where any horse or any neat cattle shall be kept, and every owner of any horse or head of cattle shall maintain a covered bin, vault or cellar satisfactory to the Superintendent of Health, in which shall be placed all manure or refuse from such horse or cattle." [2]

In Newark there must be provided an "underground and properly covered manure vault of sufficient capacity to care for all manure that may accumulate in such stable or department; said vaults shall not be nearer than ten feet to the line of an adjoining lot, street, alley, or public place without a permit from the board." It is also often required that all manure shall be kept in the bin or vault, or that "it shall not be allowed to collect in such stable, shed, barn, or apartment, or on the ground outside of said boxes, pits, or vaults":

"The manure pit shall be constructed of brick and stone, laid in cement and so situated as to allow the manure when removed to be loaded inside the stable.

"When such water-tight pit or cellar is situated under the building, it shall be ventilated by a shaft not less than twelve inches square, carried two feet above the roof of the main building.

"The drainage of every stable shall be properly conducted to the proper sewer whenever practicable and to the satisfaction of the board of health.

"In every case the ventilation and drainage shall be made satisfactory to the board of health." [3]

In Lynn and Cambridge it is simply required that no manure shall be allowed to remain uncovered outside of a stable building. In Boston the board of health requires large stables to keep a wagon on the premises and to keep the manure in that. In New York City the use of

[1] Asbury Park, Sanitary Code (1897), Sec. 48.

[2] Providence, Rules of Board of Aldermen (1900), Chapter 1, Sec. 9.

[3] Fitchburg, Rules and Regulations of Board of Health, Secs. 3, 4, 6, 7.

bins or vaults was formerly insisted upon, but lately they have been forbidden under sidewalks, and their use outside of stables requires a permit. The object of the board in discouraging vaults is to encourage the use of baling as a means of storing and removing manure, as is shown in the section of the code here given:

"That every owner, lessee, tenant, and occupant of any stall, stable, or apartment in the built-up portions of the City of New York, in which any horse, cattle, or other animal shall be kept, or of any place in which manure, stable refuse, or any liquid discharge of such animals shall collect or accumulate, shall cause such manure, stable refuse, or liquid to be promptly and properly removed therefrom, and shall at all times keep or cause to be kept such stalls, stables or apartments, and the drains, yards, and appurtenances thereof, in a clean and sanitary condition, so that no offensive odors shall be allowed to escape therefrom. It shall be the duty of every such owner, lessee, tenant or occupant, to cause all manure and stable refuse to be removed daily from such stable or stable premises, unless the same are pressed in bales, barrels or boxes, as hereinafter provided. It shall not be lawful to remove manure and stable refuse in carts or wagons, or to cart the same within the city limits without a permit from the board of health, and such carts and wagons shall be of a construction approved by said board, and every such cart or wagon must have a permit from the board in writing, and be used in accordance with the terms of such permit and not otherwise. Manure carts and wagons shall be loaded within the stable premises and not upon the street or sidewalk, and shall be removed from such premises in a manner not in any way offensive or to cause any nuisance. All manure and stable refuse when transported through the streets must be so covered and secured that no part of the same will fall upon the street, and so as to prevent the escape of offensive odors, and the same shall not be unloaded or deposited within the city limits, except upon the conditions of a permit in writing from the board of health, and at such docks and places as shall be approved by the board, and to which a permit in writing for such use shall have previously been granted by said board. No manure or stable refuse shall be allowed to be thrown upon or fall and remain upon any street or sidewalk or upon any ground near any stable, and no manure and stable refuse shall be allowed to remain for more than twenty-four hours in any place within any stable, unless it is pressed in bales, barrels or boxes. No manure vault or receptacle shall be built or used on any premises within the built-up portions of the city, nor in any other part of the city, except pursuant to the terms of a permit granted therefor by the board of health.

"Every owner, lessee, tenant or occupant of any stall, stable or apartment, in the built-up portions of the City of New York, in which any horse, cattle or other animals shall be kept, and from which the manure and stable refuse is not removed daily as hereinbefore provided, shall cause the same to be pressed in bales, barrels or boxes, at least once in each day, and so pressed as to reduce the same to not more than one-third of the original bulk. Manure and stable refuse pressed in bales, barrels or boxes, shall be removed to such docks or places as shall be approved by the board of health, and to which a permit in writing for such use shall have previously been granted by said board, and such bales, barrels and boxes shall not be opened until delivered at such dock or places."[1]

Amount of Manure Allowed on Premises.

In Cambridge not more than two cords of manure is allowed to accumulate or remain on the premises. In Newport it is three cords

[1] City of New York, Sanitary Code (1899), Sec. 120.

between the first of May and the first of November. In Lynn owners are not to "allow large quantities of manure to accumulate" between the above dates. In Scranton not more than five wagon loads shall accumulate between the fifteenth of May and the first of November. In Cleveland not more than one two-horse wagon load shall accumulate except at a slaughter-house, where it is removed daily.

The use of manure as a fertilizer is sometimes permitted by ordinance:

"Provided, that a reasonable amount of manure may be allowed at the discretion of the health commissioner, to be accumulated on private premises, for the purpose of cultivating the same; and provided further, that whenever, in the opinion of the health commissioner, such accumulation is a nuisance or detrimental to health, it may be forbidden and designated a nuisance under the prior provisions of this ordinance."[1]

A similar rule is found in Omaha and St. Louis.

Permits for Removal.

As shown above, permits are required for removal in New York City, and they are also required in a few other places.

Manner of Removal.

Many cities require the removal of stable manure in tight wagons or covered wagons:

"No person shall remove any manure, except in a tight vehicle, with a canvas cover so secured to the sides and ends of the vehicle as to prevent the manure from being dropped while being removed."[2]

"Manure shall not be loaded upon or across any passageway or sidewalk, except in stables heretofor constructed from which it is impossible to load it otherwise, and in such cases the passageway or sidewalk shall be thoroughly cleaned and swept immediately after such loading."[3]

The New York rules were given on page 164. New York was the first city to introduce baling manure in order to lessen the nuisance arising from its storage and transportation. Baling is encouraged as was shown, by requiring that manure shall be removed daily unless baled. Very little manure is as yet baled. In 1896 the following were the average daily receipts at the docks:

Manure loose in carts	996 tons.
" " " barrels	65 "
" in bales	4 "

Time and Frequency of Removal:

As was stated above, in New York City, the removal of stable manure must be daily unless it is baled.

[1] Denver, Ordinance 44 of 1893, Sec. 59.

[2] Boston, Ordinances (1890), Chapter 49, Sec. 8.

[3] Cambridge, Regulations of Board of Health (1897), Sec. 40.

"Where one or two horses are kept the manure must be removed once every week in summer and once every two weeks in winter; where three or four horses are kept, and from livery stables, it must be removed every day to the city dump or without the city limits." [1]

. . . "In all cases where this board shall by written notice so require all manure or excreta shall be removed from all stables and premises where it may accumulate as often as once in each week." [2]

The hours for removal are very often limited, as it is considered that in certain locations, or at certain seasons, less nuisance is created by removal at night. In Jersey City the hours prescribed for removal are between 6 P. M. and 7 A. M. In Camden the inspector may forbid its removal between 6 A. M. and 10 P. M. In Newport the hours during which it may be removed are 5 P. M. to 10 A. M. between the first of May and the first of November. In Boston:

"No person shall remove manure, or cause or suffer the same to be removed, between the first day of May and the first day of November, except in the night-time, after twelve o'clock, and in accordance with a permit from the board of health." [3]

In Cincinnati:

"Every person using any stable, building or structure in which any horse or mule is habitually kept or stabled, is required to remove the manure from such premises at least once every day, except during the months of May, June, July, August, and September, when such manure shall be removed at least twice every day, once before the hour of 8 A. M., and once after the hour of 6 P. M." [4]

In Cleveland stable manure is not to remain on the premises over seventy-two hours between May and September inclusive.

Disposal of Manure.

In most sections of the country, stable manure is so valuable to market gardeners in the vicinity of cities and large towns, that its ultimate disposal is a problem easily solved. The only question is how to get the manure to the consumer. In most cities, probably all except the very largest, there appears to be no serious objection to carrying it into the country in properly constructed and covered wagons; but in the largest cities, and notably in New York, much nuisance has in the past been caused by the transportation of stable manure into the country. The dumps at which it was loaded on to cars and boats, were loudly complained of. The dumps, have however, been largely brought under control by enforcing the provisions of the sanitary code as shown on page 164. These rules require that the manure shall be closely covered when carried through the streets and only deposited at designated

[1] Denver, Ordinance 44 of 1893, Sec. 111.

[2] Newark, Sanitary Code (1888), Sec. 46.

[3] Boston, Ordinances, Chapter 49, Sec. 7.

[4] Cincinnati, Manual of Health Department (1898), Sec. 43.

places. In Milwaukee the reprehensible practice of burning stable manure seems to have arisen, for the following ordinance was adopted 5 March, 1894: [1]

"The burning of manure in furnaces by manufacturing establishments and other buildings anywhere in the city of Milwaukee for the purpose of keeping up a slow fire through the night, or for any other purpose, thus creating an unbearable stench throughout the city, shall be deemed and hereby is declared a public nuisance."

Bedding.

"Nor shall any straw, hay, or other substance, which has been used as bedding for animals, be placed or dried upon any street or sidewalk, or roof of any building; nor shall any such straw, hay, or substance be deposited, nor shall accumulation thereof be made, within two hundred feet of any street, without a permit from this department." [2]

Similar rules are found in Minneapolis and Jersey City. In Fitchburg, "bedding shall not remain outside the stable."

Washing Wagons, etc.

"Owners and occupants of livery and other stables within the city, shall not wash or clean their carriages or horses, or cause them to be washed or cleaned in the streets or public ways. They shall keep their stables and yards clean, and not allow large quantities of manure to accumulate in or near the same at any one time between the first day of May and the first day of November, and no manure shall be allowed to accumulate or remain uncovered outside of a stable building." [3]

Swine.

There is probably no more offensive nuisance than a filthy hogpen. The keeping of hogs is a part of the business of the farmer and is necessary in the country, but in rural regions it is comparatively easy to keep swine so that they will not be a nuisance to anyone. Not so in villages and cities where the compactness of population is almost certain to make every hogpen a nuisance to some one. The intrinsically offensive character of the hogpen is recognized in a number of cities which forbid absolutely the keeping of swine within their borders. Among the cities may be mentioned Augusta, Boston, Cleveland, District of Columbia, Philadelphia, Raritan, Reading, and Syracuse. In the Philadelphia regulations "the keeping of hogs in the city and county of Philadelphia is absolutely prohibited." Besides the penalty imposed for violation of this, the statute of 5 April, 1849, provides as follows:

"Whenever any nuisance shall be found anywhere within the jurisdiction of the board of health, by reason of the keeping of hogs or other animals, the board of health, in addition to their power of destroying the pens or other enclosures containing such animals, or of otherwise abating and removing such nuisances, be and

[1] Milwaukee, Report of Board of Health, 1894.

[2] City of New York, Sanitary Code (1899), Sec. 130.

[3] Lynn, Board of Health Rule 31.

they are hereby empowered to seize such animals and deliver them over as forfeited to the guardians for the relief and employment of the poor of the city of Philadelphia, for the use of said poor, and it shall be the duty of said guardians of the poor, on notice of the board of health, to receive the said animals, and pay the expense of their removal."

In Delaware local boards of health are authorized by statute to destroy offensive hogpens.[1] A more moderate procedure than the preceding is to forbid the keeping of hogs in certain sections, usually the compact or built up portions of the city. This is the regulation in Fitchburg, Lowell, Manchester, N. H., Memphis, Newport, R. I., and Rochester. In Bangor, Me., they are not to be kept in the compact part of the city from May to October inclusive. In Atlanta hogpens are declared a nuisance within one hundred yards of a private residence or on the watershed of the water works. In Cincinnati hogs are not to be kept "so as to annoy or offend any neighbor or other person whatsoever." In Haverhill "no swine shall be kept within three rods of any dwelling, and the pens must be kept free from standing water or filth. In Melrose, Mass., "no swine are to be kept within fifty feet of a street or within one hundred feet of any dwelling other than that of the owner, or within twenty-five feet of the owner's dwelling." In Hartford hogpens are forbidden if a nuisance, and in Wilmington, Del., if filthy, they are to be removed as are other nuisances. In Fitchburg hogs are not to be kept in or about a stable. In Cincinnati they are not to be about a slaughter house. In Bridgeport they are not to be kept within one hundred feet of a dwelling, street, park, court, church or school, and in Scranton, not within one hundred feet of a street, house, spring, or well used for drinking. In Florence, S. C., no hogs are to be kept in a lot less than two acres in size. In Connellsville, Pa., swine cannot be kept within one hundred feet of a well, or thirty feet from a house or street unless the pen is two feet from the ground and cleaned weekly.

The number of swine to be kept is sometimes limited. Thus in Florence the limit is ten, in Chicago it is three.

The construction of hogpens is rarely regulated, but in Scranton the rules of the board of health require that they shall be so constructed that

"The floor or floors of the same shall be not less than two feet from the ground in order that the filth accumulating under the same may be easily removed; and such filth accumulating in, about and under the same shall be removed at least once a week and oftener if so ordered, and on the failure of any owner or occupier of such premises so to do, then the same shall be done by the board of health at the expense of the owner."[2]

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[1] Delaware Laws, Vol. 16, Chap. 345, Sec. 3.

[2] Scranton, Rules and Regulations of Board of Health, Sec. 10.

Most communities rely, not so much on rules and regulations, for the prevention of nuisance from the keeping of hogs, as they do upon licenses. The surest way is to forbid the keeping of hogs without a license, and then withhold or revoke the license if the hogs are, or are likely to become a nuisance. Nearly every city which takes cognizance of the matter at all attempts to control the nuisance in this way. Licenses are usually issued for a year and are revocable. A fee is often charged, varying from ten cents for each hog in Newark, to one dollar in Fitchburg and New Bedford.

The yarding of hogs for sale or preparatory to slaughter is recognized as a different matter from the "keeping" of hogs, but requires a permit in Chicago, St. Louis, Rochester, and elsewhere. The unloading of hogs and driving them through the streets requires a permit in New York City and the manner of driving them also is regulated as is referred to in connection with *Slaughter Houses*.

Other Animals.

Permits are sometimes required for the keeping of other animals than swine, horses, and cattle. Fowls are frequently the cause of considerable nuisance, and every health officer in a city of any considerable size must have a good many complaints in regard to them. Geese and ducks are even worse nuisances than fowls, but they are not so commonly kept. Goats also may become a nuisance. Dogs are a common cause of nuisances from the filth they produce, the noise due to the barking, and their bites and their destruction of property. The regulations concerning the keeping of cows will be considered in connection with the milk supply. The control of dogs is usually attempted by means of general police regulations — provisions being made for their license and for the payment of damages done by the licensed dogs. This will not be considered in this book but the measures taken to prevent the spread of hydrophobia will be considered in connection with diseases of animals.

There are certain regulations in regard to animals which do not properly belong among sanitary rules but yet are sometimes found there. Among such are regulations for the driving of dangerous animals through the streets and for the prevention of the straying of animals on the highways,[1] and the prevention of cruelty to animals such as tying calves by their legs and necks while they are being transported, and the overdriving, beating or starving of animals.[2]

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[1] City of New York, Sanitary Code (1899), Secs. 89-90.

[2] Cincinnati, Manual of Health Department (1898), Secs. 131, 136.

The yarding of animals, whether they be cattle, swine, geese, goats or horses is forbidden in many cities, as Chicago, Memphis, New York, and Rochester, unless a permit is obtained from the board of health:

"That no cattle, swine, pigs or sheep, geese, goats or horses, shall be yarded within the city of Chicago, without the permit of said commissioner, or otherwise than according to the regulations of the department of health."[1]

Cleanliness of the apartments in which animals are kept is often compulsory, as in Cambridge:

"All henneries, dog kennels, and pens for any animals shall be kept clean and free from decaying food, and from filth of any kind. The buildings and pens shall be white-washed or disinfected and put in such condition as may be ordered by the board of health."[2]

In Bridgeport[3] the board of health may order the removal of any offensive sty, stable or hennery, and if the order is not obeyed, the board of health may remove it at the cost of the city.

Animals in Dwellings.

The keeping of certain animals in dwelling houses is often forbidden. Among the animals coming under this prohibition are cattle, horses, swine, goats, geese, and fowls. In Fall River fowls are not to be kept in a store.[4]

The following rule is from Lynn:

"No person shall keep any fowl or animal in any part of a dwelling house, or in any place in the city where the board of health may deem such keeping detrimental to the health or comfort of the residents of the neighborhood, or to those who may pass thereby; and said board shall have the power to remove or cause to be removed therefrom, any such fowl or animal so kept."[5]

Noisy Animals.

These are the subject of regulation in several cities. The following rule from Camden, N. J., being the form generally used:

"No person owning, occupying or having in charge any stable, house or other premises shall keep, or have or allow thereon, any dog, calf, bird or other animal which shall by noise disturb the quiet or repose of those, or anyone therein, or in the vicinity, nor shall the unnecessary blowing of steam whistles or the unnecessary ringing of bells be permitted in the city, and any person offending against any of the provisions of this section shall forfeit and pay a penalty of ten dollars."[6]

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[1] Chicago, Municipal Code (1881), Sec. 1461.

[2] Cambridge, Regulations of Board of Health (1897), Sec. 22.

[3] Bridgeport, Ordinances of 1892, No. 14, Sec. 4.

[4] Fall River, Regulations Board of Health (1894), Sec. 50.

[5] Lynn, Rules of Board of Health (1896), Sec. 29.

[6] Camden, Sanitary Code (1894), Sec. 26.

Breeding of Animals.

This is forbidden in Buffalo:

"No person shall maintain any establishment within the city limits for the breeding of animals which may in any manner be detrimental to health." [1]

Among the animals which are sometimes licensed or concerning which special regulations are adopted are the following:

Cattle.

Most regulations in regard to cattle are designed to secure the welfare of the animals themselves, but the following from Cleveland has regard to their human neighbors:

"No person shall keep, stable, or corral any cow, calf or other bovine animal within the city, other than in licensed stock and slaughter yards, nearer than twenty-five feet to any house, building, or place in use as a place of human habitation, and in the keeping such animals the distances they shall be kept from human dwelling places are prescribed to be and shall not be less than as follows, to wit:

For one animal, as above specified, twenty-five feet.

For two animals, as above specified, fifty feet.

For three animals, as above specified, seventy-five feet.

For four animals, as above specified, one hundred feet.

And for each additional animal, as above specified, more than four, there must be at least twenty-five additional feet distance observed." [2]

Fowls.

Permits are required in Boston, Haverhill, Jersey City, Newton, New York, Rochester,[3] and other cities. In the latter city the permit is required only in the built up portion of the city, and the application for a permit must be in writing. In Newton, Mass.,[4] "No live fowl shall be permitted to run at large outside the premises of its owner or keeper." In Bradford, Penn., no fowl can be kept within twenty-five feet of a dwelling. See also the rule from Lynn on the preceding page.

The following rule is found in Erie, Penn.:

"All coops or other enclosures for the keeping of geese, ducks, chickens and other poultry shall be not less than ten feet square and five feet high, shall be at least twenty feet from any dwelling, and shall be cleaned at least once a week or oftener if necessary." [5]

In Jersey City, Rochester, and Elmira, ducks and geese, as distinct from fowls, are specified as requiring permits.

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[1] Buffalo, Ordinances (1892), Chapter 25, Sec. 8.

[2] Cleveland, Ordinances (1892), Chapter 30, Sec. 523.

[3] Rochester, Ordinances of Board of Health (1895), No. 17, Sec. 3.

[4] Newton, Report of Board of Health (1896), p. 29.

[5] Erie, Rules of Board of Health (1898), p. 22.

Goats.

Permits are required for goats in Boston, Camden, Fall River, Haverhill, Jersey City, and Newark. In Lowell goats are not allowed in the "close districts," in which the keeping of swine is forbidden, and elsewhere a permit is required. Paterson has the following:

"When a permit to keep goats may be granted it shall be understood that such goats shall be either kept within the premises described in the application or tethered on pasture, and such proviso shall be stated on the permit.[1]

Pigeons.

"*Be it ordained by the council of the City of New Orleans*, That it shall be unlawful for any person or persons owning or harboring pigeons to allow them to go at large within the city limits."[2]

Vaults and Cesspools.

There is probably no form of nuisance which in the aggregate causes so much annoyance as privy vaults. A single one of these contrivances may render life in a whole neighborhood almost unendurable in the summer time; and when it is remembered that until within a very few years there was scarcely to be found a city in which large numbers of vaults did not exist, it is not to be wondered at that the department of health has waged an unceasing warfare against them. It is safe to say that before vaults were largely done away with in the city of the writer, over three-quarters of all the complaints made to him were in regard to them. Privy vaults are not only nuisances, they are probably also real sources of danger to health. The excrements in cholera and typhoid and perhaps in other diseases contain large numbers of pathogenic germs, and in fact it is only through the excretions that cholera and typhoid are spread. It is certainly much safer to get rid of all excrement promptly by turning it into the sewer than it is to store it up, with all its possible seeds of disease, near our dwelling places. There is every reason to believe that disease germs are harmless after they reach a sewer (unless perchance the latter empties into a public water supply), but there is certainly a possibility they may be spread from a vault. The fact that many cities which have few privy vaults (and which have a good water supply), are particularly free from typhoid, would lend color to this belief. For these reasons, boards of health have long considered privy vaults things to be rid of, or in failure of this to be rigidly controlled. Such nuisances as these so manifestly come under the general authority granted to local health boards, that it is rare that special authority in regard to them is conferred by statute.

[1] Paterson, Sanitary Code (1887), p. 26, Sec. 9.

[2] New Orleans, Ordinance No. 1390, Council Series of 7 September, 1886.

This is, however, sometimes done. Thus in Rhode Island[1] the town councils may make rules and regulations in regard to privy vaults and cesspools, and may regulate and control the construction of the same. In New Jersey[2] boards of health are to regulate the construction, location, and manner of emptying cesspools and privies. In Michigan[3] and Colorado[4] boards of health may regulate the care of vaults and may abolish them.

Students of social science tell us that many of the institutions and customs which are at the present time unfavorable to the welfare and progress of society, were at a former period of civilization steps in progress. It is much the same with the privy vault. While in a modern city, adequately sewered, privy vaults are nuisances to be abolished as speedily as possible, it is otherwise in new communities unprovided with underground drains. Here the privy vault marks a forward step. It is far better than the indiscriminate disposal of excreta on the ground. So we find that while in the modern city the privy vault is forbidden, it is required in all unsewered districts, whether of city or country. Rules were formerly found which required the construction of a privy vault and cesspool for every house, but with the introduction of the water closet this was allowed as an alternative, and with the construction of sewers the water closet was alone permitted. In a few cities the old rule requiring a privy vault for every house still remains, but is usually modified by a later rule requiring water closets and sewer connections where there is a sewer. Sometimes, as in Cleveland, a privy vault or water closet is required "for every building and all premises." In St. Louis they are to be provided for every dwelling, store, livery stable, tenement house, warehouse, factory, mill, or foundry. In Cleveland they must be "of sufficient size and number to accommodate all persons who work in or inhabit" the premises. In Providence one vault or water-closet is required for every dwelling house. In Boston the statute requires not less than one to twenty persons.[5] In Chicago "every owner, lessee, keeper, or manager shall provide or cause to be provided, adequate privy vaults or water closets." In Denver the health commissioner may order the owner, lessee, agent, or occupant to provide a privy vault, but a hearing must be given if desired. In the District of Columbia, where persons are employed for trade or business, separate accommodations must be provided for both sexes.[6] The rules in regard

[1] Rhode Island, General Statutes (1896), Chapter 92, Sec. 20.

[2] New Jersey, General Statutes (1895), p. 1636, Sec. 12.

[3] Michigan, Compiled Laws (1897), Secs. 4466–7.

[4] Colorado, Act of 17 April, 1893, Sec. 7.

[5] Massachusetts, Chapter 382 of 1885, Sec. 1.

[6] Act of Congress of 25 January, 1898.

to privy vaults and cesspools are often made to apply only to those constructed after the passage of the act. The act of Congress referred to above, prescribing the construction of vaults, was not to affect old vaults until one year after its passage. Old, defective vaults may be removed under general nuisance laws, and then the new vault, which is required, must be built in accordance with the regulations. In Albany the building or "maintenance" of vaults is forbidden without a permit, and in Denver the rules apply to vaults used or maintained as well as those to be constructed.

Permits.

In very many cities a permit is required from the health department before a privy vault or cesspool can be constructed. This must be a written or printed permit:

"Any person intending to construct a privy vault or cesspool, shall first obtain a written permit so to do from the health officer, which permit shall designate the location on lot, distance from any house, well, or spring, the kind of vault and cesspool, whether to be made water-tight or otherwise, and depth thereof, and shall state that ventilation is required. In case any less depth than ten feet is required in the construction of any privy vault, such permit shall state that the owner, agent, occupant, or person in charge of the same, shall submit to all requirements thereafter made by the health officer or the director of police, intended to keep said vault clean and in good condition. Any person violating such permit, or constructing any such vault or cesspool, without obtaining the same, or disregarding the rules, orders or regulations of the director of police, shall be punished as prescribed in this subdivision." [1]

In Cambridge

"Every application for such permit must be in writing, accompanied by a plan of the premises showing the nearest adjacent houses, and all public or private ways or places on which the premises abut, and a statement of the number of persons for whose use the vault is intended." [2]

In some places a fee is charged for the permit, as twenty-five cents in Camden. In several cities a permit is only required if the vault or cesspool is to be on the line of a sewered street. Often, as we shall see, vaults and cesspools are forbidden wherever there are sewers, and hence in Cincinnati an application for a permit must be accompanied with a certificate from the proper department that there is no sewer on the street.

Inspection.

Most rules which require a permit also require an inspection to see if the terms of the permit or the rules of the department have been complied with. Thus in Wilmington:

[1] Cleveland, Ordinances (1892), Chapter 30, Sec. 478.

[2] Cambridge, Regulations of Board of Health of 1897, Sec. 33.

"The building inspector, who, being satisfied by personal inspection, or by a deputy, that this ordinance has been complied with, shall give a certificate to that effect, for which certificate the person so applying shall pay to the building inspector a fee of fifty cents, and the building inspector shall make and preserve a record of all such certificates issued by him, and shall deliver, at the end of every three months, a list of the same to the secretary of the board of health, who shall transcribe the same in a book provided for the purpose." [1]

Not only is the usual penalty in the shape of a fine imposed in case vaults are constructed or maintained contrary to the regulations provided, but the vaults may be summarily destroyed.

"And in case the condition or construction of any vault or privy shall be different from the requirements of this section, the board of health may cause the same to be cleansed, repaired, amended, altered or removed, at the expense of the owner or party occupying the estate in which such privy or vault may be; *provided*, they shall first give such owner or party occupying a legal notice, and allow the space of at least forty-eight hours for such owner or occupant to comply with such notice." [2]

Location.

The distance of vaults from the street line, lot line, buildings, wells, etc., is often prescribed. The distance which a privy vault must be set from the line of the lot varies much in different cities. Two feet perhaps, is the most common limit. Usually the limit for the distance from the lot line and the street line is the same, but sometimes it is not. Thus in Buffalo, a vault may be within ten feet of the street (or nearer if an alley), or five feet from the lot line; in Paterson, ten feet from the street and four feet from the lot line; in Jersey City, ten feet from the street and three feet from the lot line, and in Newark, ten feet from the street and two feet from the lot line. In Lowell the vault must "be at least two feet from the line of every adjoining lot unless the owner of such lot shall consent and agree otherwise." Vaults must be a certain distance from buildings upon the same or other lots. Thus in Bridgeport no privy vault must be "nearer than twenty feet of the doors or windows of any dwelling house, school or building." In Rochester it must be "at least fifteen feet distant in either direction from any adjoining building used for human habitation or for the storage of human food." In Denver the distance is ten feet. In Paterson no privy vault shall be within fifteen feet of the foundations of a dwelling house. In Augusta, Ga., the rule is that

"No surface privy shall exist within thirty feet of any dwelling house in this city, if the yard in which it is located be of such length and width as to permit such privy to be of like distance from the dwellings surrounding it. In such yards as it shall be impossible to obtain thirty feet from contiguous dwellings, then such privy shall be placed equidistant from all nearest dwellings as far as practicable." [3]

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[1] Wilmington, Health Ordinance, Sec. 7.

[2] Lowell, Rules of Board of Health (1894), p. 30, Sec. 1.

[3] Augusta, Sanitary Ordinances (1888), Sec. 10.

In Utica a vault must not be near enough to a house "to be detrimental." It is still more important that vaults and cesspools should be far enough removed from sources of drinking water to prevent pollution. In Denver no privy vaults shall be built within ten feet of a well, and in Cincinnati it must not be within eight feet of a cistern. In Utah and Utica a vault must be fifty feet from a well; in Camden, sixty feet; in Westbrook, Me., one hundred feet, and Spokane, two hundred feet:

"No privy-vault, cesspool, or reservoir, into which a privy, water closet, cesspool, stable, or sink, is drained, unless it is water tight shall be constructed, dug or permitted to remain within one hundred and fifty feet of any well, spring, or other source of water, used for drinking or culinary purposes, unless the surface of such vault, cesspool or reservoir is at a lower level than the bottom of such well." [1]

In Jersey City vaults are not to be "within a distance to be determined by the board of health of any well or cistern," and the distance fixed is ten feet in clay soil and twenty feet in sandy soil.

It would hardly seem necessary to forbid the location of vaults in cellars of dwellings, but such a rule may be found in Buffalo and other cities, and sad to say, experience has proved it necessary. In Fall River no privy shall open directly from any living or food storage room. In Portland, Ore., cesspools and privy vaults may not be built in the street. Sometimes specific provision is made for changing the location of vaults already built which have become offensive:

"Whenever any privy vault or cesspool is situated upon a lot on a street in which there is no public sewer, if the said privy vault or cesspool from any cause becomes, in the judgment of the board of health, offensive or dangerous to the health of the public, then the board of health may order a change of location of such privy vault or cesspool to some other place on the same premises. In case the owner or owners or the premises upon which such nuisance exists shall neglect or refuse to obey such order, within seven days after the same has been issued, then the board of health may cause the same to be done at the expense of the city." [2]

Size.

In Rochester all privy vaults must be of such dimensions as to contain at least fifty cubic feet for every family or group of five persons using the same. On the other hand a maximum is prescribed in Cambridge: "the cubic contents of any one vault shall not exceed eighty cubic feet unless otherwise stated in the permit." In the District of Columbia[3] the maximum is eight cubic feet, or if a movable receptacle is used two cubic feet. In Fall River it shall not be less than seventy-two cubic feet. In Elmira it must be between fifty and two hundred and sixty cubic feet.

[1] Scranton, Rules and Regulations of Board of Health (1887), Sec. 11.

[2] Bridgeport, Ordinances (1892), p. 180, Sec. 2.

[3] Act of Congress, 25 January, 1898. Sec. 4.

Depth.

All sorts of regulations are in force concerning the depth required for privy vaults. Shallow vaults are sometimes prescribed in order that they may hold less and the contents consequently be removed oftener. In other cases boards of health imagine that it is desirable to have them deep in order to keep the contents as far out of the way as possible, and also in order that if it is a leaching vault the liquid may leach away better. Again if leaching vaults are allowed, and wells are also in use to furnish drinking water the shallower the vault the less the danger of contamination. In New Orleans privy vaults constructed after the passage of the ordinance are not to extend over two feet below the surface of the ground. In Paterson they must not be more than four feet deep. Most cities, however, require deep vaults. In Jersey City vaults must not be less than eight feet deep. In the Pennsylvania cities of the second class vaults must be at least six feet deep, and in Chicago they must be six feet deep if within forty feet of a street, dwelling house or well, but in such cases they must be water tight. In Cincinnati and St. Louis they must be ten feet deep.

In Reading, Pa., and Wilmington, Del., vaults must be twenty feet deep except as otherwise provided:

"The vaults of every privy which may be constructed within the city limits, shall be digged to the depth of twenty feet, or shall be at least six feet deep, at the option of the owner or proprietor, *provided*, however, that in case of a well six feet deep, it shall be built and floored with sound and well burnt bricks, laid on edge at the bottom and in cement impervious to water, and the wall shall be puddled with clay, one foot thick, except when the same is digged in solid clay ground, and also *provided*, that when rocks, or water permanently springing or flowing into the well from beneath the surface of the ground, or other natural obstacle, render it expedient, in the judgment of the Building Inspector, that such well should be made of the depth of twenty feet, such well may be sunk to any depth less than twenty feet and not less than six feet, as upon application to him may be allowed by the Building Inspector, who shall consider the circumstances of the particular case and direct such depth as he deems expedient."[1]

Materials.

Unless it is forbidden by law the privy will frequently be set over a simple hole in the ground[2] and even if a vault is provided it will, unless otherwise ordered, be walled in and prevented from caving by whatever is cheapest and most convenient. Usually this is lumber, or perhaps rough stones, and then come well laid stone walls, and finally brick or stone laid in cement. Rough wooden walls of board or plank, or perhaps a barrel are the kinds of vault usually found beneath privies

[1] Wilmington, Del., Health Ordinance (1892), Sec. 7.

[2] The Report of the Health Commissioner of St. Louis for 1893–94, p. 56, states that there were large numbers of such privies in the city.

in the country or small villages, and are not unknown in cities of large size. Thus in San Antonio, a rapidly growing city, the report of the board of health[1] states that in 1892 there were in the city 3,000 lumber vaults, 1,000 barrel vaults, and 1,300 earth vaults, by which latter it is to be supposed is meant the primitive form of vault.

Most cities require that privy vaults shall be water-tight, and for this purpose specify that they shall be constructed of brick or stone laid in cement. In Cincinnati "in exceptional cases and by special permission will oak plank be allowed as a substitute." In Bradford, Pa., vaults may be of two-inch plank. Sometimes, as in Newton, the walls are simply to be strong enough to keep from caving. In most cities the walls are to be eight inches thick. In New Orleans the vault "shall if built adjacent to any wall whether party or otherwise be separated therefrom by solid masonry of not less than two feet thickness laid in cement and thoroughly waterproof."

Special attention is also given to the bottom of the vault. In some cities the bottom may be of twelve inches of concrete or of a single piece of flag. While efforts are generally directed to obtaining a water-tight bottom, the opposite condition is occasionally sought, as in a certain Ohio town where vaults must be tiled to carry off the water. In New Orleans the walls of vaults must be carried one foot above the surface of the ground. In Cleveland all vaults must be constructed in accordance with plans furnished by the health officer. The plans are shown in Fig. 1.

In Cleveland "'sewer vaults' may be connected with the waste water pipes from kitchen sinks and with the rain water spouts from the roofs of dwellings or other buildings with sufficient water supply therefrom to keep the same properly flushed."[2] Vaults or closets flushed with waste water from the house have been used to a limited extent in Providence and Haverhill, but they were not satisfactory. They have also been used in Newark and Paterson, but are now forbidden in Newark. These vaults receive all the drainage from the house, and the outlet leading to the sewer is closed by a valve which can be raised daily or oftener to flush the vault. The valve and method of flushing may be used in vaults which are flushed with city water. A valve of this type, shown in Fig. 2, is made by John Royle & Sons, of Paterson, N. J.

The commissioner of health in St. Louis recommends that privy vaults be constructed of large vitrified pipes.[3]

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[1] San Antonio, Report of Health Department for 1892, p. 31.

[2] Cleveland, Ordinances (1892), Chapter 30, Sec. 447.

[3] St. Louis, Report of Health Commissioner, 1893, p. 56.

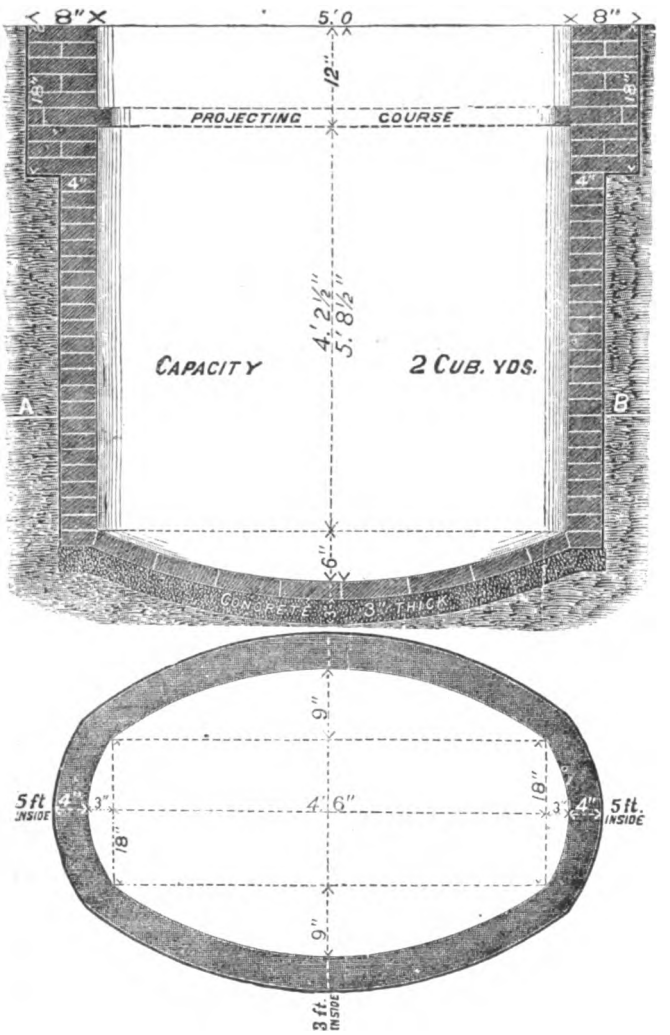

FIG. 1.

Access and Ventilation.

It is often specified that vaults shall be easy of access to inspectors and shall be provided with suitable openings for cleaning, and that such openings shall be properly covered. In some cities vaults must be ventilated. In New Orleans they "shall have a flue or ventilator sufficient for ventilation, extending above the surrounding windows or communicating with a chimney."

Old Wells Not to be Used as Vaults.

Abandoned wells are willingly used by landlords as privy vaults, for their leaching capacity is great, as they extend down into the current

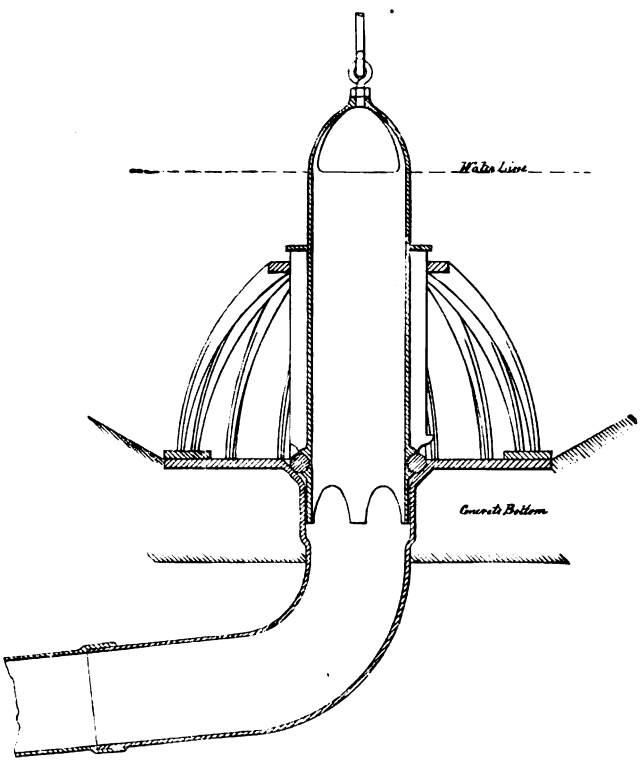

FIG. 2.

of ground water, and they will therefore last a long time without being cleaned. Their capacity for mischief is correspondingly great, for they pollute a large area of soil at a depth which prevents rapid oxidation, and they are certain to pollute neighboring wells. Hence this use of wells has been in many cities forbidden. Thus in Youngstown, O.:

"No abandoned well, coal bank, or coal shaft, whether in operation or otherwise, shall be used as a sink, cesspool, or privy vault."

An inquiry of the state board of health in 1896 showed that such a use of old wells was generally forbidden in the state of Ohio.

Sewer Connection for Vaults.

The question of connecting privy vaults with sewers has been treated differently in different cities. Sometimes it is considered advisable to connect the vaults with the sewer in order, it is presumed, that as much offensive material as possible may be daily removed from the premises. Thus in Chicago, when on lots adjacent to sewers, vaults must be connected therewith. The following regulation was adopted at Asbury Park:

"Every privy vault, cesspool or catch basin which now is, or which hereafter may be connected with a street sewer, shall be provided with a wrought-iron grat-

ing, the openings of which shall not exceed one inch in width. The bars of such grating shall be one-half inch in diameter and every grating shall be of such size as may be in each case in writing directed by this board; no such grating shall be of less size than fourteen inches square. Said grating shall be placed over the outlet from said vault; the said outlet to be placed in the side of the vault, and the bottom of the outlet to be not more than one inch from the bottom of the vault. A trap shall be placed on the drain from every privy vault or catch basin as near as possible to said vault or catch basin." [1]

On the other hand connection with a sewer is in some cities expressly forbidden, except by permission. The practice of connecting vaults with sewers was formerly recommended in Providence, but it was found very unsatisfactory. To prevent solids from obstructing the drains, the vault had to be practically a catch basin and therefore remained partly full all the time. It was often neglected more than before the connection was made, the owner arguing that the vault would now take care of itself, and needed no cleaning. Moreover, the drain sooner or latter was sure to become stopped and then the condition was the same as if no connection had been made. Such connections are not now allowed, and they are forbidden in many other cities.

The use of "school sinks" has been advocated in certain cities and under certain conditions as offering a satisfactory substitute for vaults where water closets could not well be put in. A school sink is essentially a long narrow trough filled with water and used as a vault, and flushed by hand at stated intervals, usually once or twice daily. A brick and cement vault may be constructed, which will answer the purpose, but it is not so smooth or durable as iron and is more likely to get out of order. These contrivences are most often used for schoolhouses, workshops, and tenements which have a competent janitor in charge. They are forbidden in some cities as being less desirable than water-closets:

"No sluice vault so called, or any form of so called water-closets, having no flush of water applied at the time of using, shall be constructed on any premises in this City." [2]

In Providence they are only allowed in factories, shops, and schools, and experience has shown that in other situations they are quite sure to be neglected. When permitted, their construction and use is regulated. Thus in Buffalo they are not to be maintained in any cellar. The following is the Cincinnati rule:

"Basin water-closets of approved design may be connected with the sewers. They must be so constructed as to have a proper supply of water, and allow them to be flushed out clean to the bottom, and they must so be flushed out at least once every day, and any neglect or failure on this point will render the offender liable to

[1] Asbury Park, Sanitary Code (1897), Sec. 42.

[2] Cambridge, Regulations of Board of Health (1897), Sec. 32.

be prosecuted for causing a nuisance. They must also be so constructed that the contents can not pass into the sewer without a sufficient quantity of water passing into the sewer at the same time." [1]

Overflow.

Vaults must not be provided with an overflow :

"No person shall construct any drain for the purpose of conveying the waste water or overflow from any vault or cesspool upon his premises, to the sidewalk, gutter or street surface, and all persons who now have such drains are required to remove the same, and no person shall hereafter allow any waste water or overflow from any drain, vault or cesspool to flow from his premises on to the street or sidewalk." [2]

Boxes and Earth Closets.

Tubs, or boxes, or earth closets are sometimes substituted for the regulation privy vault. Boxes set above ground instead of an excavated vault are in use in several cities, among which may be mentioned Atlanta, District of Columbia, Macon, Memphis, Richmond, Warren, and other Ohio cities. In Atlanta excavated vaults are forbidden and boxes are required. There were in 1898, 10,797 of these in use. In Memphis also, privy vaults are forbidden, and it is required that there shall be

"In their stead a receptacle for fecal matter, which may consist of a water-tight box, with handles, holding from three pecks to a bushel, let in under the privy seat, or a bucket or tub of such size and construction as the Board of Health may prescribe; or a cement platform, raised at the edges six inches above the earth and sloping toward the centre, may be used, subject to the approval of the Board of Health; and at least once a day the excrement in the receptacle shall be covered with dry earth or dry ashes." [3]

It will be seen from the last clause that the privy receptacles in that city are intended to be earth closets. The same is true in Atlanta where "the contents of such receptacles are to be deodorized or mixed with fine earth or coal ashes daily." The material is then removed by the city once or twice a week. These privy boxes are considered by the health department to be far superior to the old-fashioned vaults. The regulations in Warren, O., are still more rigid :

"In every privy not having sewer connection or vault, there shall be placed a keg, box, or other receptacle containing dry earth, ashes, or lime, or a mixture thereof, and a cup or small shovel with which to apply the same. Such privy drawer or other receptacle in lieu thereof, shall be thoroughly sprinkled at least once each day, with such earth, ashes, lime, or mixture; shall never be allowed to become entirely full; and shall be completely emptied and disinfected as often as once in every six months." [4]

[1] Cincinnati, Manual of Health Department (1898), Sec. 57c.

[2] Fall River, Regulations of Board of Health (1894), Sec. 22.

[3] Memphis, Ordinances (1879), Sec. 258d.

[4] Warren, Sanitary Code (1897), Sec. 24.

A printed notice to this effect is posted in each privy. These privies it will be seen, approach in construction and use, the true earth closets, and it is such privies that are permitted by the rules of Newton and Fitchburg, and Westbrook, Me. This form of privy has, however, not been much used in New England cities. In the District of Columbia the construction of privies and their receptacles has been regulated by a recent Act of Congress.[1] The provisions of this act are set forth in the following circular issued by the health officer of the District:

"The following memoranda, based upon an Act to regulate, in the District of Columbia, the disposal of certain refuse, and for other purposes, approved January 25, 1898, have been prepared for the guidance of persons contemplating the erection of privies:

"(1) No privy can be maintained lawfully without a permit from the Health Officer. (2) No privy can be maintained lawfully on any lot for the accommodation of which a public sewer and a public water main are available. (3) No privy can be constructed or maintained lawfully unless every part of it is at least five feet from the line of any adjoining lot, two feet from any street or public or private passageway, ten feet from any building used or intended to be used as a dwelling or place of business, and fifty feet from any well or spring likely to be used as a source of water for drinking or domestic purposes. (4) Every privy must be constructed and maintained in such manner and position as to afford ready means of access thereto for the purpose of cleaning it, and so as to permit the removal of the contents from the privy to the public street without carrying them through any dwelling-house or place of business. (5) Every privy must be constructed so as to prevent undue exposure of the occupants.

"The following figures represent vertical sections of privies, and show such details as are required by law:

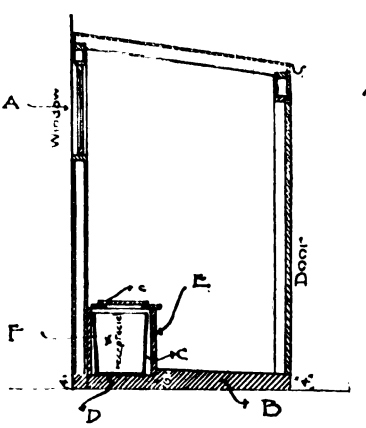

FIG. 3.

Privy with a movable receptacle.

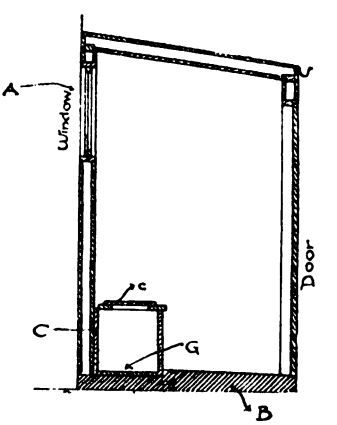

FIG. 4.

Privy with a fixed receptacle.

[1] Act of Congress, 25 January, 1898.

I.

"The following details apply to all privies (See Figures 3 and 4):

"(A) A sufficient opening for ventilation, as near the top as practicable, communicating directly with the external air.

"(B) A floor paved with some non-absorbent material, and constructed so that its upper surface shall not be in any place less than four inches above the level of the surface of the surrounding ground and have an incline toward the door of the privy of half an inch to the foot.

"(C) A receptacle for filth, provided with a suitable cover (c)."

II.

"If such privies are to be provided with a movable receptacle, the following additional details are necessary (See Figure 3):

"(D) A floor over the whole area of the space immediately beneath the seat, the surface of which floor shall not be in any place less than four inches above the level of the surface of the surrounding ground; such floor, and the whole extent of each side of the space between the floor and the top of the seat, to be constructed of some non-absorbent material.

"(E) The seat, the aperture therein, and the space beneath, must be of such dimensions as to permit the movable receptacle for filth (F) to be fitted beneath the seat in such manner and position as to prevent the deposit of filth elsewhere than in the receptacle. The seat shall be so constructed that the whole, or a sufficient part of it, may be readily removed or adjusted so as to afford adequate access to the space beneath for the purpose of cleaning the same and removing the receptacle therefrom or fitting it therein.

"(F) A receptacle for filth, not exceeding in capacity two cubic feet, made of metal, water-tight, provided with handles, and so constructed that it may be closed with a cover and made air-tight at the time of its removal."

III.

"The following details apply to privies where the receptacle for fecal matter is fixed (See Figure 4):

"(G) The bottom of the receptacle must be in every part at least four inches above the level of the surface of the adjoining ground, and adequate means of access for cleaning the receptacle and removing the filth therefrom must be provided. Such receptacle must not exceed in capacity eight cubic feet, and must be constructed of such material or materials, and in such manner, as to prevent absorption by any part of it of any filth deposited therein, or any escape of its contents by leakage or otherwise, except in process of cleaning.

Cesspools.

These contrivances do not receive the attention given to privy vaults, for they are usually covered and so not offensive, unless their contents overflow, though it is true that they contaminate the soil over a larger area than do vaults, and because of the volume of liquid the contents are more likely to leach into wells. It is a common provision, however, to require cesspools to receive all the house drainage of those premises which are not situated on the line of sewered streets. Thus in Camden:

"That no person shall draw off, empty, pump, or allow to run into any ground, gutter, water-course, alley, or street the contents of any sink, cesspool, or privy-vault, or any kitchen, laundry, or other waste water, or any water or liquor deleterious to health, used by any manufacturer or other person in any trade or other-

wise, from any house, premises, place of business, manufactory, hotel, restaurant or other place or building in this city; such drainage, when not connected with a sewer, must be collected into water-tight cesspools or reservoirs, provided with the proper traps and properly covered, and the contents of said cesspools cleaned and removed as prescribed in section 8, under a penalty of ten dollars." [1]

Sometimes, as in Denver, it is required that cesspools be ventilated. It is seen from the above that the pipe leading to a cesspool from the house must be trapped, and this requirement is found in other cities. In several Massachusetts cities a minimum capacity of eighty cubic feet is provided for; in Lynn this is to be measured two feet below the ground. In Minneapolis the cesspool "is to be of such dimensions as the inspector of buildings may direct." In Augusta, Ga., cesspools are forbidden and must be discontinued and filled up within such time as the president of the board of health may direct.

Permits for cesspools are also sometimes required, for their construction may be supervised by the board of health. The location of cesspools is usually the same as that prescribed for vaults; but in Omaha instead of being required to be a certain distance from the lot line, they are required to be as far towards the rear line of the lot on the alley as possible. This is doubtless because a covered cesspool can be no offense to owners of the alley, and the farther it is from the house the less danger there is of its leaching into the cellar. It is in a few cities as Cambridge, Camden, Omaha, Paterson, and Asbury Park, required that cesspools are to be water tight, but it can hardly be possible that this rule is enforced. In other cities a more reasonable requirement is that cesspools shall be tight in certain locations. Thus in Fall River, Haverhill, and Lawrence, if within twenty feet of the lot line or the foundation of a dwelling, or within fifty feet of a well, a cesspool must be "absolutely water tight." The following rules have been recently recommended by the state board of health of Michigan for the location of vaults and cesspools:

"(1) Forbid the construction or reconstruction of any cesspool, within one hundred feet of any well the water from which is used for drinking or culinary purposes, however such cesspool is constructed, which is to receive the contents of a water closet; (2) forbid the construction or reconstruction of any privy vault within one hundred feet of any such well; (3) require, or at least recommend, the use of the dry earth closet and frequent removal of its contents wherever there is not a public water supply and complete water carriage disposal of excreta through sewers; (4) recommend and so far as possible secure the extension of the water supply and public sewers, wherever this extension is practicable, to all residences or buildings where otherwise there are wells endangered by privies or cesspools; and (5) forbid the use of cesspools and privy vaults wherever it is practicable to obtain sewer connection." [2]

[1] Camden, Sanitary Code (1888), Sec. 9.

[2] Michigan, Board of Health, Abstract of Proceedings, 15 January, 1898, p. 7.

Cesspools like vaults must have proper approaches for cleaning and they must usually be covered over.

Care of Vaults.

Rules for the maintenance of privy vaults are as necessary as for their construction. Naturally such regulations are found almost exclusively in local ordinances or rules of boards of health, but occasionally they are found in statutes. Thus in the act creating a bureau of health in the Pennsylvania cities of the second class,[1] the owner of the vault which has become offensive, is liable to a fine of twenty-five dollars a day; and in New Mexico[2] it is required by statute that water closets, vaults and cesspools must "be kept in a healthful condition." The local rules in regard to vaults are often of this same general character. In Boston "no person shall maintain a water closet, vault or privy in an unwholesome, unclean or imperfect place or condition." More specific rules are, however, frequently found. Thus as was shown on page 152, it is often prescribed what shall not be allowed to go into a vault, and in Cleveland it is expressly provided who shall be responsible for a violation of this rule. In New Bedford if garbage is found in a vault it is at once cleaned by the board of health at the owner's expense. A large amount of liquid of any kind in a privy vault renders it particularly offensive and hence it is often forbidden. In Newark the sanitary code provides:

"That no rain water leader, waste-pipe or soil-pipe shall discharge or run into any privy vault, nor shall any slops or filthy water be deposited therein, unless said privy vault shall be connected with a sewer."[3]

The purpose is here evidently to permit the discharge of liquid into a vault if it is at once permitted to run out again; but this will do little to prevent the nuisance, and the rule in Cincinnati is better; "no roof or surface water, or kitchen slops shall be allowed to flow into any privy vault."

An ordinary provision is that a vault shall not overflow or become full to within a certain distance of the top, Thus in Yonkers, the sanitary code provides as follows:

"SEC. 71. No person shall draw off, or allow to run off into or upon any ground, street or place in the City of Yonkers, the contents (or any part thereof) of any vault, privy, cistern, cesspool or sink; nor shall any owner, tenant or occupant of any building to which any vault, sink, privy or cesspool shall appertain or be attached, permit the contents or any part thereof, to flow therefrom, or to rise within two feet of any part of the surface of the adjoining ground, or permit said contents to become offensive."

[1] Pennsylvania, Chapter 258 of 1895, Sec. 7.

[2] New Mexico, Chapter 30 of 1891.

[3] Newark, Sanitary Code (1888), Sec. 35.

In Asbury Park and Fitchburg the distance is one foot; in Providence and Holyoke one and one-half feet; in Colorado Springs, Denver, and Omaha two and a half. In Philadelphia when the contents are three feet from the top, or when it leaks into a cellar, a vault must be at once cleaned; in Cincinnati and other Ohio cities, when four feet from the top.

When a vault does become offensive or a nuisance, the nuisance may be abated under a general nuisance law. In the District of Columbia the recent Act of Congress referred to, authorizes the health officer to clean privies and assess the cost as a tax against the property.

Ordinances frequently require the disinfection of vaults:

"SEC. 50. All putrid or offensive material of any kind whatsoever and the night soil and the contents of sinks, privies, cesspools, garbage cans and all noxious substance in said city and every receptacle of offensive matter shall be treated with disinfectants of such kinds, and at such times and in such manner as may be required by the health commissioner." [1]

In Fall River vaults must be disinfected often enough to keep them free from all offensive odors. In Augusta, Ga., privies must be disinfected every two weeks.

In Charleston vaults must be cleaned once a year. In Camden vaults must be cleaned yearly before the first of May. In Fall River they must be cleaned whenever they become offensive. Probably the general custom, if not the law, is to cause vaults to be cleaned once each year. The reports from Ohio cities to the state board of health in 1896 showed that some cities did not require cleaning more than once in two, three and four years and even five years. A few cities required it twice a year and one board of health required cleansing monthly, but earth closets were there largely used. Many cities provide that when vaults are cleaned they must be cleaned to the bottom.

In Atlanta the sanitary inspectors are required during the spring and summer months to inspect each privy weekly, and if it is found offensive, to notify the owner or occupant to put it in order forthwith. Failure to carry out the order within six hours subjects the owner to a fine or imprisonment.

Removal and Destruction of Vaults.

Even with the greatest care in the municipal supervision of vaults, they are almost always nuisances. Health officials are without exception, agreed that the only way to be rid of this nuisance, is to abolish the vaults; but the destruction of privy vaults requires the substitution of something else. The general opinion is that water closets connected

[1] Denver, Ordinance 44 of 1893.

with the sewers, are in most cases the best arrangements for the disposal of excreta. To be rid of as many privy vaults as possible within his jurisdiction, and substitute water closets and sewer connections, is an object that every health officer has in mind. The authority to make rules for the destruction of privy vaults, and for providing proper sewer connections, is doubtless included in every general grant of sanitary legislative power, so that there has not been much special legislation on this subject.

Nearly all cities that are provided with a sewer system that is at all adequate, are making strenuous efforts to be rid of their privy vaults and cesspools, and this is true of the smallest towns as well as of the largest. Nearly every health report gives a list of vaults abolished during the year. This work requires in the aggregate a large expenditure by the house owner, and in many cases it entails some hardship. It must therefore be prosecuted with judgment and some moderation in times of depression, such as prevailed from 1893 to 1898. Many cities report that not as many vaults were abolished in 1894–7 as in the years just preceding. Cities that have long pursued the policy of getting rid of their vaults, are now almost free from these nuisances. New York City is a conspicuous example, and there are few vaults now remaining below Harlem River. Boston and some other of the Massachusetts cities, as Worcester, Newton, and the town of Brookline, have very few vaults. On the other hand they are very numerous in Baltimore, Philadelphia, Chicago, and St. Louis. In Chicago in 1892 there were 40,000. In Buffalo at that time there were over 25,000, but in four years' time 12,000 of them were abolished.

The desired end is frequently accomplished by local regulations, which may take various forms. Thus the maintenance or construction of vaults on sewered streets may be forbidden. Sometimes, as in Bridgeport, the prohibition is only to apply to the future construction of vaults, more often it applies to all existing vaults as well as to future constructions:

"No privy vault, cesspool or receptacle of filth of any kind shall hereafter be constructed, allowed or maintained upon any lot or premises abutting upon a street in which a public sewer is laid, but proper water closets, school sinks, latrines, or some means approved by this board, with a properly laid pipe, shall be provided, which shall discharge into said sewer; and all such water closets, latrines, or other means, shall be provided with a flow of water sufficient to wash all filth into the public sewer, under a penalty of twenty dollars for a violation of any part of the provisions of this section." [1]

In Milwaukee the construction of vaults is forbidden only in certain districts, which are defined by the ordinance. Sometimes the prohibi-

[1] Camden, Sanitary Code (1894), Sec. 2.

tion applies only to vaults, as in Milwaukee and Cincinnati, but in most cities cesspools as well as privy vaults are forbidden. In other cities, as Newark, vaults and cesspools are not to be constructed on the line of a sewered street without a permit from the board of health.

As most cities require all buildings to be supplied with either a privy vault or water closet, the rules just referred to practically compel the putting in of water closets. Other cities, as Atlanta, Camden, Cleveland, Newburgh, and Paterson have rules which definitely require water closets for all houses on sewered streets.

At other times the local regulation takes the form of a requirement that the drainage of premises shall be connected with the sewer. Perhaps the most complete rules governing this matter are those recently enacted for the District of Columbia.[1] As Congress reserves to itself legislative power in such matters, this act is practically a local regulation. According to this act every lot on a sewered street must be connected with the sewer, so that all the drainage of such lot, except human urine and fecal matter, shall flow into the sewer, but if there is a water main in the street, then all the drainage, whether water or liquid refuse of any kind, shall flow into the sewer; but it is further provided that when there is upon the lot "any building used or intended to be used as a dwelling, or in which persons are employed or intended to be em ployed, in any manufacture, trade, or business, or any stable, shed, pen, or place where cows, horses, mules, or other animals are kept," the lot shall be connected with both sewer and water main, but if there is no such structure on the lot, it need not be connected with either unless ordered by the health officer. The health officer is to enforce this law by ordering these connections made, and after thirty days' notice the Commissioners of the District may, after proper notice, do the work and the cost is to be included in the tax levy.

Sometimes the wording of the law as to what drainage shall be connected with the sewer is general, as in the Providence act, where it is to be "the drainage of the land and premises." In the District of Columbia it is, as shown above, more specific. Many cities, however, do not include so much of the drainage in their forced connections. Thus in Augusta, Ga., it is "all slops or other matter as this board shall decide." In Albany water closets and sinks are to be connected with the sewer; in Haverhill all "sink water and waste water," and in Paterson "all slops, filthy water and liquid waste."

Various expressions are used to define the locations in which vaults and cesspools are forbidden, as on "lots adjoining a sewered street," "abutting on a street in which a public sewer is laid," or "when a

[1] Act of Congress, 19 May, 1896.

public sewer abuts the estate," or "on the line of a sewered street," or "adjacent to a street in which there is a main or common sewer," on "lots bordering on a public or private sewer," or "situated on a public or private street, court or passageway, in which there is a public sewer." In other cities, as Yonkers, no vaults or cesspools are allowed "wherever it is practicable to connect any premises in the city with a public sewer," or in Atlanta, "when sewerage is accessible," or in Little Falls, N. Y., "if within a reasonable distance"; in Spokane, "if within 300 feet of a street and the land is platted"; in Manchester, N. H., "within 100 feet." This is quite an important point, as estates are not infrequently situated only a short distance from the sewer, when it would be perfectly feasible to connect by means of a private drain. In St. Louis the connection must be made with street drains, whether private or public.

Usually water mains are laid wherever sewers are, generally preceding the latter; but there are exceptions, and in some cities it is not deemed wise to forbid the use of vaults (thus necessitating water closets), unless there is assured a sufficient water supply to flush them. The rule in Buffalo forbids vaults and cesspools only on those streets within the city "where there is a sewer, and the city water is in said street."

Power to compel the destruction of privy vaults is contained in the general power over nuisances (provided, of course, that the vault is a nuisance, as can be shown of most of them). In Fitchburg, Lowell, and some other Massachusetts cities, vaults are thus dealt with. A case in Lowell was carried to the superior court, and a decision favorable to the city secured. In Philadelphia also, vaults are abolished as nuisances and the courts have upheld this action.[1]

At least three states, Massachusetts,[2] Michigan,[3] and New Jersey[4] have enacted general laws for the removal of privy vaults and the making of sewer connections, and there are special acts for Boston,[5] Manchester,[6] and Providence.[7] The following is from Massachusetts:

"No privy vault shall be established in a city which accepts this act either upon premises situated on a public or private street, court or passage way, where there is

[1] Pennsylvania, Supreme Court Reports 3, p. 239; John W. Adams *vs.* Board of Health.

[2] Massachusetts, Chapters 74 and 132 of 1890.

[3] Michigan, Compiled Laws (1897), Sec. 4466.

[4] New Jersey, Chapter 345 of 1896.

[5] Massachusetts, Chapter 450 of 1889.

[6] New Hampshire, Chapter 165 of 1885, Sec. 7.

[7] Rhode Island, Chapter 777 of the Public Laws as amended by Chapter 1407 of the Public Laws.

a public sewer opposite thereto, or upon premises connected with a public or private sewer, without permission in writing first obtained from the board of health of such city. And whenever there is in such city a privy vault so situated which, in the opinion of the board of health of such city, is injurious to the public health, said board shall declare the same to be a nuisance, and forbid its continuance, and sections twenty-one to twenty-three inclusive of chapter eighty of the Public Statutes shall apply to such nuisances so declared." [1]

As will be seen from the above, the act must be accepted by a city before it becomes operative in that city. A number of the Massachusetts cities have accepted this act and are removing their vaults under it. The form of order used in Cambridge is shown in Appendix 38.

The Massachusetts law also compels connection with the sewer:

"Every building situated on a public or private street, court or passageway, in which there is a public sewer, shall, when required by the board of health of the city or town in which it stands, be connected by a good and sufficient particular drain with such public sewer." [2]

The Providence act is as follows:

"The Board of Aldermen of the City of Providence may compel any abutting owner or occupant of land upon any street in said city in which there is a sewer, to connect the drainage of his land and premises with such sewer, and may direct said owner or occupant to fill up and destroy any cesspool, privy-vault, or other arrangement for the reception of drainage."

The law also provides for the service of the orders and for an appeal, but even during the pendency of the appeal the board of aldermen "may cause any cesspool, privy vault, or other arrangement for the reception of drainage to be filled up and destroyed." The board of aldermen acting under this law caused a certain vault to be filled after the appeal from the order was taken. This case was argued at length before the appellate division of the supreme court and a somewhat lengthy decision amply affirmed the board's power.[3]

The Boston act requires the construction of water closets as well as a connection with the sewer, and in a case where a vault was connected with the sewer and occasionally flushed with water, the intent of the law to require true water closets, was affirmed in the superior court.[4]

A special limit of time is given by some rules for getting rid of vaults on streets in which new sewers are built. In Paterson this is sixty days. As the burden of sewer assessments is quite heavy in some cities a much longer time is often allowed. In Providence over a year's time is

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[1] Massachusetts, Chapter 74 of 1890, Sec. 1.

[2] Massachusetts, Chapter 132 of 1890, Sec. 1.

[3] Rhode Island Reports, Vol. 20, Part I., p. 235. Harrington *vs.* Board of Aldermen of Providence.

[4] 155 Massachusetts, p. 281, Commonwealth *vs.* Mercy Roberts.

usually granted after the building of a sewer, unless the vault is particularly offensive.

A penalty in the form of a fine is usually imposed for violations of rules requiring sewer connections. In St. Louis the fine is from fifty dollars to two hundred dollars per day. Besides a penalty for failure to make sewer connection as provided by law it is sometimes as in Yonkers prescribed that "no house hereafter erected shall be inhabited or used by any person before the same shall be connected with a public sewer if practicable."

Filling Vaults.

When privy vaults and cesspools are no longer in use or are ordered destroyed, it is quite necessary that the entire contents should be removed and they be filled up with some clean material as earth, sand, gravel or ashes. Some rules require that they shall be disinfected, and that they shall be filled under the supervision or direction of the board of health.

Private Sewage Disposal.

For the District of Columbia the following provision has recently been enacted:

"SEC. 13. That no person shall, in said district, construct or maintain any system of sewage disposal by means of broad irrigation, sub-soil irrigation or otherwise, except upon a permit issued by the commissioners of said district. Applications for said permit shall be in writing to said commissioners and shall be accompanied by detailed plans of the system which it is proposed to construct and maintain; and no permit shall be issued under this section until said commissioners are satisfied that said system can be maintained without nuisance or danger to public health."[1]

Filthy Shores.

A peculiar form of nuisance has received special attention in Brooklyn and is liable to be found in any seaboard city, though the conditions for its development are much more favorable in Brooklyn than elsewhere. For a number of years past Brooklyn has had a regular patrol of its shore line for the purpose of keeping it free from offensive material cast upon it by the tides. Brooklyn has nearly fifty miles of shore front, much of which is of great value for recreative purposes. Three inspectors and a force of shore laborers are employed during the summer months. From two to five laborers are employed for each inspector, the largest number during the very hot weather. The following table shows the work of the Coney Island district force for eight months beginning April 1, 1895:[2]

[1] Act of Congress 25 January, 1898.

[2] Brooklyn, Report of Department of Health, 1895.

TABLE BY MONTHS, SHOWING THE WORK ACCOMPLISHED FOR THE EIGHT MONTHS BEGINNING APRIL 1, 1895.

	Dogs.	Cats.	Rats.	Offal.	Meat.	Fowl.	Beds.	Fish.	Sheep.	Hogs.	Total.
April	180	169	170	60	100	20	36	9	4	0	748
May	129	167	128	120	20	20	14	0	3	0	601
June	144	116	94	147	220	6	15	40	5	0	787
July	52	82	147	76	600	23	2	298	4	2	1,286
August	68	171	143	197	669	29	7	249	3	0	1,536
September	53	116	203	191	413	41	0	95	4	0	1,116
October	40	38	29	193	138	4	70	255	1	1	769
November	75	56	58	255	58	23	10	79	4	1	619
Totals	741	915	972	1,239	2,218	166	154	1,025	28	4	7,462
Human bodies, one each in May, July, August and November											4
Grand total											7,466

The inspectors showed that a very considerable number of the dead animals came from the shores in and about New York Bay, but a large part of the garbage and most of the nuisance was due to the illegal dumping of garbage from the garbage scows of the various cities and towns. Newport has had some trouble from garbage on the beach, but the matter of prevention lies in the city's own hands, as all the garbage dumped at sea is from that municipality. Trouble has occurred from other sources, and it became necessary to forbid the burial upon the beach of dead animals and garbage.

In Cambridge, at one time, a boat was kept on the river for eight or ten months of the year, to bury or send down stream offensive matters that floated onto the shore.[1]

Public Dumps.

The disposal of refuse will be considered in another chapter, but there is a form of refuse nuisance which perhaps had best be mentioned here; and that is the nuisance arising from dumps. This is no new cause of offence, for Lanciani[2] has given a very vivid description of the dumping grounds of ancient Rome. From that time till the present, wherever there have been cities there has probably been trouble from those spots which are set aside for, or are unconsciously selected as the common place of deposit for indiscriminate refuse. Vacant lots or lands wherever they are found in a city are very attractive to the eyes of all scavengers and all others who have any material whatever that is useless and an encumbrance. Even in those cities in which the munici-

[1] Cambridge, Report of the Board of Health 1892, p. 7.

[2] Boston Medical and Surgical Journal 1886, Vol. CXV., p. 541.

pality removes garbage, night soil, ashes and rubbish, such lots in a surprisingly short time become covered with all sorts of litter which private parties find more convenient to dispose of in that way than to retain upon their premises until the stated calls of the official scavengers. Thus nuisances arise, although the city may be doing its best to promptly remove all refuse and dispose of it without injury to its citizens. In those cities in which the removal of any of the above specified forms of waste is left to the individual, and is accomplished through the agency of private scavengers the dump nuisance is, of course, much worse. When much organic matter in the shape of garbage, decayed vegetables, dead animals and the like find their way to a dump, the stench in warm weather becomes almost unbearable; but even a small amount of such matter on the surface of the ground is a serious annoyance to neighbors. Moreover, the papers, straw and fine ashes which are constantly in dry weather blown from the surface of a dump render it almost impossible to keep clean premises in the vicinity. Dumps are the resort of children and others seeking coal, kindling wood, junk, etc., and the temptation to set fire to the paper and other inflammable material is very great, so that smouldering fires are an almost constant adjunct to a dump, and the smoke of a slowly consuming mass of rubbish brings a still larger area under the influence of the nuisance. Hence dumps have received much official notice. The best remedy is an efficient removal and destruction of refuse by the city. Next, and in addition to this, is a control of the dumps by rules and supervision. New York and Brooklyn where there was formerly much trouble from dumps forbade the deposit of offensive material on vacant lots by the following:

"That no animal or vegetable substance nor street sweepings, muck or silt, nor dirt gathered in cleaning yards, buildings, docks or slips, nor waste of mills or factories, nor any materials which are offensive, or tend by decay to become putrid, or to render the atmosphere impure or unwholesome shall be deposited or used to fill up or raise the surface or level of any lot, grounds, dock, wharf, or pier, in or adjacent to the built-up portions of said city, or any ground filled for the purpose of building thereon, unless pursuant to a special permit from the department of health.

"That no ground or material filled with offensive matter or substance, or that will emit or allow to arise, through or from the same any offensive smell or deleterious exhalation, shall adjacent to or within the built-up portion of said city be opened or turned up or the surface thereof removed, between the first day of May and the first day of October of any year, except according to permit first therefor obtained from the department of health."[1]

A somewhat similar provision is found in the charter of the City of New York. In Providence the duty of preventing nuisance from the deposit of such material on vacant lots is placed upon the owner:

[1] City of New York, Sanitary Code 1897, Secs. 13 and 14.

"Whenever land is used as a dumping ground, the owner or owners of such ground or the agent of said owner or owners, shall cause all offensive or decaying matters to be completely covered with earth or clean ashes immediately upon the deposit of such matter." [1]

In Jersey City sunken lots must be fenced for the same reason, and also to prevent persons falling in. In Cambridge it is also provided that if the owner of a vacant lot wishes to raise the grade he must obtain a permit from the board of health:

"No person owning or occupying any premises within the limits of the City of Cambridge, and no city officer controlling or in charge of city premises, shall cause any ashes, or refuse material to be placed thereon, or shall allow such premises to be used as a public dump for ashes, refuse or other material without a permit from the board of health, and only in accordance with such permit.

"Any person owning or occupying any premises with this city, and desiring to fill such premises with dry waste, ashes, or rubbish, shall make written application to the board of health describing the land and the filling material proposed, and also the sources from which he proposes to obtain the material.

"A copy of Sections 46, 47, 48, and 49 of these regulations shall be posted conspicuously on each dumping ground in this city.

"The permits named in Section 46 shall be in force for three months, and may be renewed thereafter for periods not exceeding one month each by the Clerk of this Board." [2]

In Cleveland similar permission is required and the director of public works can order the lot drained before it is filled.

Providence has special regulations to stop the nuisance caused by flying and burning papers:

"No person shall dump or deposit, or set fire to any waste paper or other inflammable material, except upon land owned or rented by such person." [3]

It is easy enough to make such rules, but difficult enough to enforce them. To enforce them absolutely it would require an officer day and night on every place in the city which is used as a dump. Constant supervision is necessary. In Brooklyn there were in 1895 sixteen regular inspectors of the dumps, but the results were far from satisfactory. Notwithstanding the sixteen inspectors the dumps of Brooklyn cannot be in a very savory condition if one can judge from the nine photographs following page 224 of the report of the health department for 1895.

A better plan than mere inspection is the employment by the city of a man or men on the dump to keep it in order, level it off, prevent the dumping of offensive matter, put out fires and cover the decomposing matter which is certain to find its way there somehow or other, no

[1] Providence, Ordinances (1900), Chapter 19, Sec. 6.

[2] Cambridge, Regulations of the Board of Health (1897), Secs. 46, 49, and 51.

[3] Providence, Ordinances (1900), Chapter 19, Sec. 9.

matter how strict the supervision. Of course when a city does the removing of ashes and rubbish with its own teams, it should, and usually does take care of its dumps if it has any within the limits of the city; but even when the scavenging is left to private endeavor it is also often considered a duty to look after the dumping places. In Providence the city employs a man to look after a large dump on private land near the centre of the city, and all parties are encouraged to use this as a dump in order that the material may be as well cared for as possible. Dumps are at the best, a nuisance to all who live or do business near them; but those cities which do not insist rigidly on the separation of different kinds of refuse, and which have no crematory for combustible rubbish, are liable to have trouble from dumps as long as vacant lots exist to tempt deposits. In this connection may be quoted the following rule of the board of health of Fitchburg:

"No person shall burn on premises occupied by him any garbage, refuse woolen, silk, leather or india rubber goods or other substances so that the same shall evolve offensive odors and gases while burning."[1]

Not only is the filling of lots with rubbish and offensive matters forbidden or controlled as above, but the opening or disturbing of such lots is also regulated. This is included in the New York rules quoted, and in similar rules in other cities.

Lots Covered with Stagnant Water.

Town or city lots covered with stagnant water require quite a different treatment from large areas of swampy land in agricultural districts. The area of such city lots is not usually great, they do not as a rule need draining, but simply filling, and the cost of making the improvement is generally offset by a corresponding gain in the value of the property. Such lots are often serious nuisances for they may not only help the spread of malarial disease, but they often are depositories of all sorts of filth; in fact "dumps," and hence are offensive because of the foul odors that come from them. It would seem reasonable to deal with such conditions by means of the power given in general nuisance laws. Stagnant pond-holes can be abated as are other nuisances. The case of the City of Salem *vs.* Eastern Railroad Co.[2] demonstrates this. Nevertheless it is sometimes deemed advisable to make special statutory provision for this form of nuisance:

"The board of health shall have full power and authority to make such by-laws and ordinances as said board shall from time to time, deem necessary and proper, for the filling, draining and regulating of any grounds, yards or cellars, within the city, that may be sunken, damp or unwholesome, or which it may deem proper to

[1] Fitchburg, Rules of the Board of Health, 1887, p. [illegible]

[2] Massachusetts Reports, Vol. [illegible], p. [illegible]

fill, drain, raise, lower or regulate, and also, for causing all such lots of ground in the city adjoining the Hudson river or the East river, or Long Island sound, as it may, from time to time, think proper, to be filled with wholesome earth or other solid materials, so far into the said rivers respectively as said board shall, from time to time, deem expedient for promoting the health of the said city." [1]

See also Ohio Annotated Statutes (1900), Section 2149. In Boston[2] the board of health may, when the public health demands, order any lots not on tidewater filled to a height of eleven feet above mean low water. Considerable opposition was manifested by the owners, but bills in equity were brought in the superior court and decrees obtained, and since then many areas have been filled. In very many cities rules are adopted in relation to lots covered with stagnant water without any such statutory provision, for there is little doubt that power to legislate in this direction is included in any general grant of sanitary legislative power.

The damming or obstructing the flow of water so as to cause this nuisance is forbidden in Atlanta and Youngstown, where a fine with a maximum of $500 is to be imposed. In Denver, Omaha, Paterson, and Reading a pond of stagnant water on a lot is declared a nuisance and the owner of the lot is therefore subjected to a fine. In other cities, as Augusta, Ga., District of Columbia, Jersey City, New Orleans, and Rochester, the owner of such a lot is to be ordered to fill or drain it and on neglect so to do is fined. The time given varies from three days in Jersey City to sixty in New Orleans. In Newark it was, however, found necessary to forbid the filling of lots in the summer on account of the mixed garbage that was dumped.[3]

In Atlanta, Camden, Charleston, Cleveland, Hartford, and St. Louis, an order to fill or drain wet and sunken lots may be issued by the city council in Hartford, city marshal in Atlanta, the inspector in Camden, and the board of health in the other cities. If the order to fill is not obeyed, the proper authorities can do the work and collect the costs from the owners, and in Charleston it is expressly provided that the owners shall in addition be subject to a fine.

Swampy Lands.

For centuries wet, swampy, and boggy lands have been considered unhealthy; and there is most excellent reason for believing that such localities are indeed fertile fields for the development of malarial disease. It is natural that the dread of malaria should cause very great efforts to be made by communities to get rid of such dangerous nui-

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New York, Chapter 378 of 1897, Sec. 1214.

Massachusetts, Chapter 342 of 1893.

Newark, Report of the Board of Health (1897), p. 17.

sances. A score of centuries ago extensive works were undertaken in Italy for the purpose of draining marshes and rendering the surrounding region healthful, as well as for bringing new areas under cultivation. Similar undertakings have been carried out as occasion arose in all civilized lands.

The fens of England have thus been largely freed from malarial disease, as have numerous areas in our own country. When extensive drainage works are undertaken for improving a considerable territory, it is almost always with the chief purpose in view of obtaining a pecuniary reward in the shape of large areas of fertile land. A secondary purpose of rendering the region more salubrious may or may not be in mind, and in any event it is usually considered of less importance than that first mentioned.

At least seventeen states and territories have laws which provide for the drainage of wet and swampy lands. In very many of these states, especially those in which there are large areas of marshes which are likely to repay in agricultural products the cost of drainage, very elaborate and comprehensive laws, often covering many pages, provide for the drainage of these lands on a large scale. Such laws provide for the appointment or election of township or county drainage commissioners who are to exercise control and supervision of drainage operations within their respective jurisdictions. The township commissioner has jurisdiction over drains which begin and end in the township; the county commissioner controls drains which extend from one township to another. Usually the inception of the work lies with the land owners, some number of whom even as small as five, may petition for the commissioner. The commissioner then may investigate, and if in his opinion the proposed improvement will conduce to public health or convenience, he may make a survey and lay out the course of the drain or drains.

Cases arise which are not as simple as the filling of city lots and which do not, on the other hand, require such extensive treatment as is necessary for the draining of large areas. It frequently happens that in the country, and sometimes too within the city limits, considerable areas of swampy land are found which would never be drained for agricultural purposes, and yet it may not be deemed advisable to let their improvement depend upon a routine nuisance order of a board of health. In Massachusetts[1] there are special statutory provisions in regard to just such "wet, rotten, or spongy lands covered with stagnant water," which are declared to be nuisances. On petition in regard to such lands, the

[1] Massachusetts, Public Statutes (1882), Chapter 80, Secs. 28-35, and Chapter 358 of 1887.

board of health shall investigate, and if they deem action advisable, give a hearing and notify all interested parties to be present. The board of health may thereupon order the nuisance abated and abate the same, and the damages awarded shall be paid by the town, and assessments shall be made upon the town or others for benefits; but any person aggrieved by the order may appeal to the superior court, and during the pendency of such appeal all proceedings in abatement are stayed. This law has been found so unsatisfactory that the city of Boston secured the passage of the special act referred to on page 197. In several other states, as New Hampshire, Oregon, Pennsylvania, Tennessee, Virginia, and West Virginia, there are somewhat similar laws providing for the abatement of nuisances of this character and the assessment of the costs of abating them. In several of these laws special attention appears to be given to the relief of those owners of such unwholesome property who desire to drain it, but are prevented by a lack of proper outlet, the natural outlet being controlled by parties who will not co-operate. In New Hampshire the selectmen or aldermen are given authority to act in such cases, but in most other states commissioners are to be appointed. In the City of New York[1] the board of health, when in its opinion the public health requires such drainage of lands, may prepare and adopt plans for the same, acquire right of way, and cause a commissioner to make the necessary estimates and assessments as in the case of the lay-out of streets. In Connecticut,[2] "when there shall exist upon any premises contiguous to any dwelling house, swampy or wet places or depressions in which a foul and unhealthy condition permanently exists arising from natural causes," the health officer may cause them to be filled at the cost of the town, but unless expressly authorized by the town, only $300 can be spent in any one year. In New York,[3] if the state board of health shall find that overflow from any canal is the cause of unhealthy, swampy places, it shall report to the superintendent of public works, who shall forthwith abate the same.

Offensive Trades.

As was stated in Chapter I, the earliest colonial legislation in regard to offensive trades was in Massachusetts in 1692. Unfortunately, the necessity for such legislation remaining on the statute books has continued to the present day, and such laws are found not in Massachusetts alone, but in very many other states. Besides such general laws relative to offensive trades this subject is considered in charters and

[1] New York, Chapter 378 of 1897, Secs. 1214–1218.

[2] Connecticut, Chapter 162 of 1895.

[3] New York, General Laws (1896), p. 2418, Public Health Law, Sec. 7.

special legislation, as in New York, Philadelphia, Memphis, and some other places. Many cities, perhaps the majority, provide by means of local regulations for the control of offensive trades. Even those cities which have charter provisions relating to this subject or which are situated in states which have legislated upon it, nevertheless seek further restrictions by means of their own rules. Thus although there is statutory legislation in New York in regard to offensive trades both in the general laws and in the charter for New York City, yet the sanitary code of the latter city has a score or more of provisions relating to this subject. Most of the local regulation of nuisances of this kind is based upon the grant of general legislative power on sanitary subjects. The courts thus seem to uphold the notion of the close relationship between noisome trades and unhealthy conditions of life. In Brooklyn where the broad terms of the act simply authorize legislation "in regard to all matters pertaining to public health" there has been much local legislation of this kind. References to some of the statutes relating to offensive trades are shown below.[1]

There are several ways of dealing with offensive trades; they may be relegated to some locality where little or no harm may be done, they may be controlled by some sort of official supervision, or lastly, they may be suppressed.

I.

The Massachusetts colonial law of 1692 provided for the location of offensive trades and this provision has been retained till the present time:

"The board of health of a town shall from time to time assign certain places for the exercise of any trade or employment which is a nuisance or hurtful to the inhabitants, or dangerous to the public health, or the exercise of which is attended by

[1] Arizona. Chapter 52 of 1895.
Colorado. Act of 17 April, 1893, Secs. 51–53.
Kansas. General Statutes (1897), Secs. 340–1.
Massachusetts. Public Statutes (1882), Chapter 80, Secs. 84–95.
Chapter 106 and 193 of 1889.
Chapter 428 of 1897.
Michigan. Compiled Laws (1897), Secs. 4456–8.
Minnesota. Statutes (1894), Secs. 1489–97.
Chapter 175 of 1899.
Missouri. Revised Statutes (1899), Secs. 2234–9.
Chapter 96 of 1899.
New York. Revised Statutes (1896), p. 917, Domestic Commerce Law, Sec. 38a-c.
Ohio. Annotated Statutes (1900), Secs. 6919–27.
Pennsylvania. Brightly's Purdon's Digest (1894), p. 1612.
Rhode Island. General Laws (1896), Chapter 93.
Vermont. Statutes (1894), Sec. 4694.

noisome and injurious odors, or is otherwise injurious to their estates, and may prohibit the exercise of such trade or employment in places not so assigned; the board may also prohibit such exercise within the limits of the town or in any particular locality thereof. All such assignments shall be entered in the records of the town, and may be revoked when the board shall think proper." [1]

The phraseology of this act also appears in the laws of Colorado, Illinois, Maine, Michigan, Minnesota, Rhode Island, and Wisconsin, and perhaps other states. Sometimes the statute is mandatory as in Massachusetts, and sometimes permissive as in Rhode Island. Usually every noxious trade is included in the operation of the law, but in some states only specified trades. In Wisconsin the law only provides for the location of slaughter-houses in cities. The Rhode Island law names "the business of boiling bones, depositing filth, keeping swine, or slaughtering cattle or other animals," and "the business of expressing oil from fish," but a later section provides as follows:

"The provisions of sections eight, nine, ten and eleven of this chapter shall extend to the place of any manufacture of, or of working in any article or substance the manufacture of which shall be deleterious to the health of the neighborhood." [2]

While the promotion of public health is the main purpose of these laws governing offensive trades, yet they are often intended to have a rather broader scope as is shown by both the Massachusetts and Rhode Island statutes. The Massachusetts law contemplates municipal control in trades which are not only "hurtful to the inhabitants or dangerous to the public health," but also such as are "otherwise injurious to their estates," and in Rhode Island the city government may forbid trades when "the public health or the public comfort and convenience" so require.

Sometimes the state law prescribes where offensive trades may not be located. Thus the Ohio law [3] forbids such trades within a certain distance of state institutions.

This control of offensive trades is usually placed in the hands of the board of health, but sometimes, as in Rhode Island, where the town council and its equivalent the board of aldermen of cities is *ex-officio* the board of health, and where nevertheless the towns and cities are authorized to establish independent boards of health and have in many cases done so, the right to locate offensive trades is still vested in the town council. In Maine where independent boards of health are obligatory, control of this class of nuisances is still vested in the "municipal offices." Sometimes, as in Denver, where permits for offensive trades

[1] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 84.

[2] Rhode Island, General Laws (1896), Chapter 91, Sec. 19.

[3] Ohio, Revised Statutes (1900), Sec. 6924.

are granted by the city council, they can only be granted with the approval of the health commissioner. In Chicago slaughter-house permits are issued by the mayor. In Cleveland the permit is to be issued by the director of police. In Rochester the ordinance requires that "such permit must be applied for in writing, specifying the nature and precise location of the business or proposed business, and such application shall not be acted upon until the second regular meeting after such application." In Philadelphia:

"No permit shall be granted to any person or persons to carry on the business of boiling bones and dead animals until after a careful inspection of the locality, buildings, apparatus, and the plans for conducting the business, and the approval of the sanitary committee." [1]

To the power to locate offensive trades is usually added the power to revoke the order granting such location. Such power of revocation lies with the board of health or other board locating the trade, but in some states, as in Colorado, Massachusetts, Michigan, and Minnesota, provision is made for the revocation of the permit by the proper court.[2]

In Rhode Island the withdrawal of the right to slaughter must only be after giving two months' notice to the owner in writing. In that state damage may by proper action be obtained from the town for any loss "resulting from such suspension or withdrawal" of location of slaughter-houses, but curiously enough a later provision removes any such liability on the part of the town in the case of the fish oil business.

As the only object of this location of offensive trades is to secure their removal from parts of the town or city where they would constitute a nuisance, the board of health may forbid their continuance in all other sections than those in which they have been located. In Rhode Island this prohibition is contained in the statute and also the penalty, which for most trades is fixed at $50 per day.

II.

A second method of dealing with noxious trades is by the exercise of some control over their management. Such control assumes that the nuisance arising from the business is not necessary, but arises from defective construction of buildings, or apparatus, or from its negligent

[1] Philadelphia, Rules of the Board of Health (1895), Sec. 182.

[2] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 85:

"When it appears on a trial before the superior court for the county upon a complaint made by any person, that a place or building so assigned has become a nuisance by reason of offensive smells or exhalations proceeding from the same, or is otherwise hurtful or dangerous to the neighborhood or to travellers, the court may revoke such assignment and prohibit the further use of such place or building for the exercise of either of the aforesaid trades or employments, and may cause such nuisance to be removed or prevented."

operation. It is hoped that when the necessity for better methods is felt through pressure brought by the community the business may be conducted without nuisance.

One way of securing better methods of conducting such trades is by licensing them. The theory of the license (when it is really a license and not used chiefly as a means of raising a revenue) is that the license will only be issued under such conditions as will secure a reasonable conduct on the part of those to whom the license is granted. The so-called offensive trades are thus often granted permits by boards of health, the board of health presumably requiring the fulfilment of such conditions as will render the trade inoffensive, or comparatively so Sometimes the granting of such permission or license is provided for by statute as in New Hampshire [1] and Vermont.

More often the licensing of offensive trades is exercised by town and city governments simply as one of their sanitary functions, without the grant of special authority. In most ordinances the offensive trades to be licensed are specified; more rarely as in Albany and Lynn the ordinance is framed in general terms only.[2]

Among the trades specified as requiring permits in various cities may be mentioned the tanning, skinning, scouring or dressing of hides, or of leather, the storing of green hides, the making of varnish or boiling of oil, distilleries, the making of lamp black, turpentine, or tar, the boiling of offal, bones, or swill fat, bone crushing, boiling, grinding, burning; shell burning, gut cleaning, glue making, the beating, drying, storing, shipping, or transporting of blood scrap, grease or offensive animal or vegetable matter; the manufacture of materials for manure, the maintenance of stock yards and pens, slaughter-houses, soap, coal-oil and vitriol factories; the storing of fertilizers; gas works, blacksmith shops, potters' shops, pottery kilns, vinegar yards, and depositories of dead animals, manufactures of asphalt, breweries, founderies, the smoking

[1] New Hampshire, Public Statutes (1891), Chapter 108, Sec. 15:

"If a person shall use or occupy a building or place near a dwelling-house or schoolhouse, or in the compact part of a town, for a slaughter-house, a place of deposit of green pelts or skins, or for trying tallow, currying leather, or carrying on any other business that is offensive to the public, without the written permission of the health officers of the town, he shall forfeit ten dollars for each month such building or place shall be so used or occupied, to be recovered for the use of the town."

[2] Albany, Sanitary Ordinances (1892), Sec. 8:

"No person or company shall erect or maintain any manufactory or place of business dangerous to life or detrimental to health, or where unwholesome, offensive or deleterious odors, gas, smoke, deposit or exhalations are generated, without the permit of the board of health, and all such establishments shall be kept clean and wholesome, so as not to be offensive or prejudicial to public health."

of fish, or meat; manufactures of starch, leather, chemicals, fertilizers; the buying, selling, or storing of skins, hides, rags, bones, or similar articles; making egg dressing, candle factories, hemp factories, pork houses, sausage houses, acid restoring, manufacturing copperas from sludge acid, distilling sludge acid, making potassic cyanide, stone quarries, and brick kilns.

Hogpens and the collection and removal of waste products, as soap grease, night soil, and garbage, often require licenses, but these subjects are considered in another connection.

Usually no fee is charged for the licenses granted for this purpose, but in Philadelphia and Cleveland a charge of $10 per annum is made, and in Chicago the fee for a slaughter-house license is $100 per annum, and for a tannery, $50 per annum. In Arizona a $10 fee must be paid for the preliminary inspection of a slaughter-house.[1] Usually a record must be kept of all such licenses.

In Wilmington, Del., offensive trades located within one mile of the city must obtain a license.

The licensing of trades to be of value as a means of preventing nuisance, implies the affixing of conditions either understood or expressed, under which the trade shall be followed, and sometimes, as in New York and Illinois, the power to do so is specifically granted. In Cincinnati a regulation of the board of public improvement requires the attachment of conditions to the permit. In Pennsylvania bone boiling and other offensive trades can only be carried on "subject to the supervision and under the regulation of the state board of health."[2]

A very large number of cities and some states have adopted more or less extensive rules for the regulation of offensive trades. Such regulations are sometimes of a very general character, as in Indiana, Tennessee, and the cities of Albany, Chicago,[3] Lynn, Memphis, Mobile, and Scranton.[4]

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[1] Arizona, Chapter 52 of 1895.

[2] Pennsylvania, Act of 19 May, 1897.

[3] Chicago, Ordinances (1881), Sec. 1380:

"That no person shall permit or have any offensive water or other liquid or substance on his premises or grounds to the prejudice of life or health, whether for use in any trade or otherwise. And every such establishment now existing shall be kept cleanly and wholesome, and be so conducted in every particular as not to be offensive or prejudicial to life or health."

[4] Scranton, Rules and Regulations of Board of Health, Sec. 7:

"And all such establishments shall be kept clean and wholesome so as not to be offensive or prejudicial to public health; nor shall any offensive or deleterious or waste substance, refuse or injurious matter be allowed to accumulate upon the premises, or be thrown or allowed to run into any public waters, streams, watercourses, street, road, or public place, unless by sewer connection. And every person

In place of or in addition to such general prescriptions as to the conduct of offensive trades many cities have made specific rules for the regulation of special kinds of business. Of all trades that of slaughtering animals appears to be the most productive of nuisance. Other offensive trades may be localized in certain sections of the country or in a few cities or even in a single city; but slaughter-houses are very numerous in all sections of the land, and are found in the largest cities and in the smallest villages, and even in the open country. The nature of the business is such that without great care a most serious nuisance at once arises. Hence slaughtering has received more attention than other trades. The Massachusetts law of 1692 mentions "slaughter-houses," and many a modern ordinance deals with "slaughter-houses and other establishments from which noisome odors may arise."

Effort is sometimes made to secure a concentration of the slaughtering business and thus obtain a better control.

In 1870[1] the Brighton abattoir was incorporated. This association could condemn land within two miles of a certain point in the town of Brighton (adjoining Boston) "as the board of health of the city of Boston shall by vote determine to be suitable for the carrying on of said business." This land was to be paid for by condemnation proceedings. A slaughter-house was then to be erected; "but no building shall be erected until the plans thereof with all details of construction shall have been submitted to and approved by said board of health of the city of Boston or some person designated by said board to examine said plans." In 1876[2] slaughtering was forbidden in Boston except on the property of the Butchers' Slaughtering and Melting Association (Brighton Abattoir), and the members were required to slaughter all animals brought to them for that purpose, the Boston board of health in cases of disagreement to appoint inspectors and make regulations.

New Orleans by ordinance of 31 March, 1891, and by a charter granted in 1895, has also established a modern abattoir. The abattoir at Terre Haute is under municipal control and all other slaughter-houses are abolished. In 1874[3] a general law was enacted to promote the formation of Swine Slaughtering Associations. Under this law a corporation with a capital of $100,000 to $500,000 can condemn not over 100 acres of land for the purpose of conducting its business, but the

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or company conducting such manufacture or business shall use the best approved and all reasonable means to prevent the escape of smoke, gases, and odors, and to protect the health and safety of all operatives employed therein."

[1] Massachusetts, Chapter 365 of 1870.

[2] Massachusetts, Chapter 144 of 1876.

[3] Massachusetts, Public Statutes (1882), Chapter 197.

location must be approved by the state board of health and the aldermen of the city or the selectmen of the town in which it is situated. The land damages are to be determined by prescribed legal proceedings before the superior court. The corporation may erect buildings for its business, but "no such buildings shall be erected until the plans thereof, with all details of construction have been submitted to and approved by said state board of health or some person designated to examine them." Each member of the corporation may conduct a slaughtering business on the premises and permits may be granted others to do so.

Rules for the location, arrangement, and construction of slaughter-houses are often found. In the City of New York it is forbidden to kill any animal in a market, and no slaughter-house can be on the same lot with a dwelling. All slaughter-houses must have adequate connection with the sewer. A water-tight floor is essential, and in Cincinnati there "must be no breakage of joints nor openings of any kind except into the sewer." It is often required that swine shall not be kept in or about a slaughter-house. The reason is that the swine always create a nuisance and that they are very liable to become infected with tuberculosis, trichinosis or other contagious disease. It is frequently prescribed that no blood pit or dung pit shall be allowed in a slaughter-house. Cleanliness is essential and is prescribed by the following:

"That every butcher and every person owning, leasing or occupying any place, room or building where any cattle have been or are killed or dressed, and every person being the owner, lessee or occupant of any room or stable where any cattle may be kept, or market, public or private, and, having power and authority so to do, shall cause such place, room, building, stall (and market, being private), and their yards and appurtenances to be thoroughly cleansed and purified, and all offal, blood, fat, garbage, refuse and unwholesome or offensive matter to be therefrom removed at least once in every twenty-four hours after the use thereof for any of the purposes herein referred to; and shall, also, at all times (unless some public authority prevents), keep all woodwork, save floors and counters, in any building, place or premises aforesaid, thoroughly painted or whitewashed."[1]

The following is a rule of the Pennsylvania state board of health:

"The owners, agents or occupiers of all slaughter-houses are required during the months of June, July, August and September, to distribute twice in each week not less than twenty-five pounds of chloride of lime about the premises, and also to remove the contents of any manure-pit or manure-pile on the premises, once in each week, the said premises and contents of manure-pits being hereby declared to be nuisances prejudicial to the public health, unless subject to frequent disinfection and cleaning as herein indicated."

A most elaborate set of regulations is found in Boston concerning the Brighton abattoir.[2]

[1] New York, Sanitary Code (1899), Sec. 83.

[2] Boston, Manual of the Health Department (1890), p. 28.

The sanitary code of the City of New York provides for the driving of animals to the slaughter-house:

"And no pigs, swine or cattle shall be unloaded from any cars upon any street or public place in the City of New York, except pursuant to a written permit from this Department.

Nor shall any cattle, pigs, swine or sheep be driven to any slaughter-house in the Borough of Brooklyn, except between the hours of eight of the evening and one hour after sunrise of the next morning; nor shall more than twenty cattle, or more than one hundred pigs or swine, or more than one hundred and fifty sheep, be driven together; and they shall be driven in streets and avenues (leading toward their destination), where they will least endanger the lives of human beings, as the Department of Health may designate, provided, that when the landing or transportation of cattle shall have been delayed or prevented by ice, fog or unavoidable accident, the Department of Health may, at its discretion, give a permit to land and drive such cattle at other hours than those herein designated.

But in no case shall cattle be driven past any school or church."[1]

Rules are of no avail without frequent inspection, and in Wilmington the ordinance provides that the inspector shall visit each slaughter-house once a week, and for neglect, shall be fined $5.

The rendering of grease is, unless carried on with great care, a fertile source of nuisance. The rendering of dead animals also is especially liable to become a nuisance, and hence is absolutely forbidden within the limits of a number of cities. The rendering of other materials, even when perfectly fresh, has to be carefully guarded, and in many places rules governing this business have been incorporated in the sanitary regulations. The most important points to be controlled are the construction of the works, the care and cleanliness with which they are conducted, and the materials treated. The rules adopted in New York and Philadelphia, here given, illustrate these points:

"That no person shall boil any offal, swill, bones or fat in the built up portions of said city, save in ordinary cooking, . . . except with a permit from the department of health.

"That all persons engaged in the business of boiling or rendering of fat, lard or animal matter, shall cause the scrap or residuum to be so dried or otherwise prepared as effectually to deprive such material of all offensive odors, and to preserve the same entirely inoffensive immediately after the removal thereof from the receptacles in which the rendering process may be conducted.

"That no fat, tallow or lard shall be melted or rendered, except when fresh from the slaughtered animal, and taken directly from the places of slaughter in the City of New York, and in a condition free from sourness and taint and all other causes of offense at the time of rendering, and that all melting and rendering are to be in steam-tight vessels, the gases and odors therefrom to be destroyed by combustion or other means equally effective, and according to the best and most improved means and processes; and everything preceding, following, and in connection with such melting and rendering, and the premises where the same shall be conducted, must be free from all offensive odor, and other cause of detriment to the public health.

[1] New York, Sanitary Code (1899), Sec. 69.

No fat, lard or tallow, shall be brought into the City of New York to be rendered or melted, and none is to be rendered or melted that has come from any place outside of said city, except as part of the living animal and except such fat as is suitable for food purposes, and is handled in accordance with the terms of a special permit in writing from the Department of Health." [1]

"The floors of all bone boiling establishments and depositories of dead animals shall be paved with asphalt, or with brick or stone well laid in cement, or with some other impervious material, and shall be well drained. All such establishments shall have an adequate water supply, and a proper arrangement of hose or pipes, as will enable thorough cleanliness to be maintained.

"The boiling of bones and dead animals, etc., shall be conducted in steam-tight kettles, boilers or cauldrons, from which the foul vapors shall first be conducted through scrubbers or condensers, and then into the back part of the ash-pit of the furnace fire, to be consumed, or by other apparatus equally efficient in preventing or counteracting the offensive effluvia.

"When bones are being dried after boiling they shall be placed in a closed chamber, through which shall be passed, by means of pipes, large volumes of fresh air, the outlet pipe terminating in the fire-pit." [2]

These rules embody the essentials of good rendering; steam-tight apparatus, the proper disposal of steam and gases, and cleanliness.

Special acts have recently been passed in Pennsylvania[3] and Minnesota[4] in regard to rendering, and other methods of disposing of material from dead animals. The Pennsylvania law requires that all establishments used for such purposes shall be licensed by the board of health and shall be conducted in accordance with the rules of the state board of health. Such rules the state board has adopted, and it has also prepared a model form for the license. The Minnesota law is apparently designed primarily to prevent the use of parts of dead animals for human food, and this is very explicitly forbidden. Any method of disposing of dead animals and parts thereof to make any article of commerce, requires an annual permit from the state board of health, for which $10 is paid; but butchers may render the materials produced on their own premises.

Dealing in hides is frequently the subject of sanitary legislation. In New Orleans it is forbidden to bring into the city any hides "which may tend to produce infection or in any way to injure or endanger health." In Philadelphia the vessel inspector on application being made for a permit to land hides is to "examine said hides and report as to their condition. Should they be found sound the permit so applied for shall be issued; but should they be reported unsound, the applica-

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[1] New York, Sanitary Code (1899), Secs. 99, 101, 106.

[2] Philadelphia, Rules of the Board of Health (1895), Secs. 184–6.

[3] Pennsylvania, Chapter 56 of 1897.

[4] Minnesota, Chapter 175 of 1899.

tion shall be referred to the board for action." Other regulations are here shown:

"No person shall keep for more than twenty-four hours any uncured hides, except at the place where the same are to be manufactured.

"No person shall cause, or suffer or permit any skunk or coon skins, or other skins of any kind, or the skins of any other animals, which emit an offensive odor, or are in a condition detrimental to the public health, to be dressed, cleaned, kept, stored or received in or upon the premises owned or occupied by him or them." [1]

In St. Louis the time during which hides may be kept is six hours. The Boston rule reads as follows:

"No green or green-salted hides or skins, or horns, shall be cured, stored, or suffered to remain within the limits of the city, except upon floors which shall be made tight and impervious to liquids, with a proper pitch, so that all liquids and filth shall readily escape from the floor into a suitable drain, the floors to be kept at all times in a neat and cleanly condition, and so disinfected that no offensive odors shall arise therefrom. No such hides or skins shall at any time be suffered to remain in or upon any street, place, or sidewalk. All horns shall be immediately removed and placed in brine, or under a cover of salt. If the hides, skins, or horns are stored in the basement of any building, there shall be such ventilation as shall secure the remainder of the building and the public from offensive odors." [2]

The charter of the City of New York [3] gives the board of health power to determine where hides shall be stored and if necessary to order their removal or destruction or to remove and destroy them if the order is not obeyed.

The sale of guano or fertilizers is sometimes regulated. In Atlanta guano is not to be kept for sale within three hundred yards of a dwelling or place of business. In Fall River "no person shall be allowed to keep for sale, or other purpose, any guano or fertilizer of any kind in any place within the city, unless by permission of the board of health."

On certain parts of the Atlantic seaboard fish are spread upon the land as a manure. In Newport, R. I., the following was the rule adopted to prevent nuisance from this:

"No fish intended for manure shall be deposited or spread upon any land within one mile of the compact part of the city, or within fifty rods from any public highway or road, in any other part of said city, unless such fish shall be so covered with earth, sand or other materials, that no offensive smell shall arise therefrom; nor shall any person cause any such fish to be conveyed into or through any public street of said city in any wagon, cart, or other vehicle, unless the same be perfectly watertight." [4]

Gas works are often a nuisance, and New York and Chicago have the following rule:

"That no person or company being a manufacturer of gas, or engaged about the manufacture thereof, shall throw or deposit or allow to run, or having the right or

[1] Cleveland, Ordinances (1892), Chapter 30, Secs. 503–4.

[2] Boston, Rules of Board of Health (1890).

[3] New York, Chapter 378 of 1897, Secs. 1207, 1209, 1211.

[4] Newport, Ordinances, Chapter 24, Sec. 1.

power to prevent the same, shall permit to be thrown or deposited in any public waters, river, canal, slip, or into any sewer therewith connected, or into any street or public place, any gas-tar or any refuse matter of or from any gas-house, works or manufactory; nor shall any such person or company allow any substance or odor to escape from such house, works or manufactory, or make any gas of such ingredients or quality that any substance shall escape therefrom, or be formed in the process of burning any gas, which shall be offensive or dangerous, or prejudicial to life or health. Nor shall any such person or company fail to use the most approved or all reasonable means for preventing the escape of odors." [1]

Tanneries are a source of nuisance from various causes, but particularly from the wastes of various kinds that are produced. The following are the rules in regard to tanneries in force in Lowell, Maine:

"It shall be the duty of every owner, agent or superintendent of a tannery to prevent the accumulations of fleshings or other offensive waste matter in or about the tannery over which he has ownership or authority. All fleshings shall be removed daily, and buried at the time of removal.

"No fleshings shall be deposited near enough to any highway to be offensive to persons travelling in said highways, nor near enough to dwellings or places of business to be offensive to persons dwelling or staying therein.

"The removal of fleshings and other waste matters of tanneries, and the disposal of them shall be only in strict accordance with the orders of the local board of health." [2]

The dealing in second-hand clothing is not exactly an offensive trade in the sense in which that term is generally used, but it is often a nuisance and is sometimes regulated. Recent experiments by William G. Bissell, bacteriologist of the Buffalo health department, have demonstrated that second-hand clothing may be the bearer of tubercular bacilli, as it doubtless may of other pathogenic organisms.[3] The Atlanta regulation in regard to second-hand clothing was doubtless adopted as a precaution against yellow fever:

"No license shall issue to any merchant or dealer in second-hand clothing until the applicant shall file with the city clerk an affidavit in writing, stating that the applicant does not have on hand, directly or indirectly, and will not, during the period covered by the license applied for, buy, receive, keep on hand, sell or deal, directly or indirectly, in any second-hand clothing imported into said city which has not been properly disinfected, and certified and registered as required by law of Georgia. For making a false affidavit to obtain the license aforesaid the affiant shall be subject to the penalty prescribed in fourth section of this ordinance.

"It shall not be lawful for any merchant or dealer in this city to sell, expose or offer for sale, at his place of business or elsewhere in said city, any second-hand clothing, or to open any package, case, or lot of second-hand clothing shipped into said city, or for any railroad employee or other person to remove the same when so shipped here from the depot or express office, without first obtaining a written permit from a sanitary inspector, which permit shall only be given upon its being made to appear to such inspector by such merchant or dealer that he has a certificate from

[1] Chicago, Ordinances (1881), Sec. 1392.

[2] Lowell, Me., Rules of Board of Health (1892), Secs. 1, 2, 3.

[3] Buffalo, Monthly Report of the Department of Health, March, 1899.

the proper officer of the board of health of the place from which said clothing may have been shipped, which certificate shall set forth the character and number of garments to which it refers; that they have been properly disinfected and when, and that there is no danger of spreading contagious diseases therefrom: Provided, the certificate presented of the officer of the place shipped from shall not be conclusive on the health officer here, but the sanitary inspector or board of health here may inspect the same, and if found to be contagious, such clothing shall be condemned and not allowed to be sold until properly disinfected. Such merchant or dealer shall pay to said sanitary inspector a fee of one dollar for each shipment of such clothing examined and certified as above provided, which said fee shall be turned into the city treasury through the clerk of council. Such inspector shall also file with the clerk of council a duplicate of each certificate given." [1]

The following regulations are found in regard to the storage and use of rags:

"Hereafter no rags or other dangerous material shall be sold or manufactured into articles to be sold for personal use, unless such rags or material shall have been previously so thoroughly disinfected as to destroy all germs of disease in a manner satisfactory to the board of health." [2]

"No rags, old paper, or other refuse material, gathered or recovered from any source, shall be brought into or allowed to remain within any building used as a dwelling." [3]

The following rule is found in New York:

"That the owners, lessees, tenants and managers of every blacksmith or other shop, forge, coal-yard, foundry, manufactory and premises where any business is done, shall cause all ashes, cinders, rubbish, dirt and refuse to be removed to some proper place, so that the same shall not accumulate at any of the above-mentioned premises, or in the appurtenances thereof, nor the same become filthy or offensive, nor shall any smoke, cinders, dust, gas, or offensive odor be allowed to escape from any such building, place or premises, to the detriment or annoyance of any person not being therein or thereupon engaged." [4]

III.

While some noxious trades may properly be conducted in sparsely settled sections of a township or city, and while all the so called offensive trades need regulation and supervision, there are certain trades that must be absolutely forbidden in some municipalities. Moreover, any trade may be so managed, either through the ignorance or wilfulness of the operators, that it is hopeless to expect any abatement of the nuisance except by the complete suppression of the business. The prohibition of trades is sometimes found in statute law, as in the charter of the City of New York:

"It shall not be lawful for any person or persons, incorporated or unincorporated, to carry on, establish, prosecute, or continue, within the borough of Manhat-

[1] Atlanta, Sanitary Code, Sec. 144.

[2] Colorado, Act of 15 April, 1893, Sec. 16.

[3] Boston, Board of Health Regulations, 28 February, 1899.

[4] New York, Sanitary Code (1899), Sec. 134.

tan, the occupation, or trade, or business of bone boiling, bone burning, bone grinding, horse skinning, cow skinning, or skinning of dead animals, or the boiling of offal, and any such establishment or establishments, or place of such business existing within said borough, shall be forthwith removed out of said borough, and such trade, occupation, or business shall be forthwith abated and discontinued, provided that nothing in this section contained shall apply to the slaughtering or dressing of animals for sale in said city. It shall be the duty of the board of health to ascertain whether any such trade or business is carried on, or continued, or established, within the limits aforesaid, and to make and cause an order to be served, in the same manner as other orders of said department are made and served, directing the discontinuance of said trade or business, and the removal of all offensive or unwholesome materials or things appertaining to said trade or business. Any such business carried on elsewhere within the city of New York shall be subject to reasonable regulations to be prescribed by the board of health, and may, upon its recommendation, be prohibited in any borough or part of any borough by the municipal assembly."[1]

More often, however, it is the authority to prohibit that is given to the local government, as in the Massachusetts law.[2] A very large number of municipalities have taken advantage of the power thus conferred and have prohibited certain offensive trades within their limits or in some cases, as in Chicago, within a certain area outside their limits. In Atlanta slaughter-houses are forbidden within the city and upon the water shed from which the city obtains its water. Sometimes the prohibition is made to apply only to trades to be established in the future, as in Wilmington, Del.

If, notwithstanding the prohibition, the trade is still followed, the remedy is found in a penalty in the form of a fine, which may be collected for each day during which the offense is persisted in. The fine for violations of these laws is usually somewhat greater than for ordinary nuisance laws; $50 is a common amount, but in Ohio it is $500. In Bridgeport it is $20 per day. But the imposition of a fine is not a very satisfactory way of abating a nuisance, especially such a nuisance as is caused by offensive trades. Considerable pecuniary interests are usually involved, and often the business creating the nuisance is of great magnitude. In such cases every possible appeal will be taken and all the tactics known to the legal profession will be made use of to perpetuate the nuisance. Hence has been felt the need of some summary method of dealing with such nuisances. In 1855 in Massachusetts[3] it was provided that the board of health could take all measures necessary to suppress the trade. Recently in Wisconsin the mayor or other municipal executive is required to remove such slaughter-houses as are forbidden by the statute, and if such officer fails in this duty he is to be fined from $[illegible]. The Rhode Island law is here given:

[1] New York, Chapter 378 of 1897, Sec. 1212.

[2] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 84.

[3] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 87.

"SECTION 1. When any building or premises in any city in this state are occupied or used for carrying on the business of slaughtering cattle, sheep or other animals, or for a melting or rendering establishment, or for other noxious or offensive trades, occupations or employments, the board of aldermen, sitting as a board of health, after appointing a time and place for a hearing, and after giving notice thereof to all persons interested, by public advertisement or otherwise, and after such notice and hearing, if in its judgment the public health or the public comfort and convenience so require, may prohibit by its order or decree the exercise of such trade, occupation or employment in such building and on such premises, indefinitely, or for such time as it shall find that the public health or the public comfort and convenience shall require.

"SEC. 2. A copy of the order or decree of prohibition under the preceding section shall be served by the city sergeant upon the occupant or person having charge of such building and premises where such trade, employment or occupation is exercised. If the party upon whom such order is served, for twenty-four hours after such service refuses or neglects to obey said order or decree, the board of aldermen may take all necessary measures to prevent such exercise, and any person thereafter continuing so to occupy or use such building and premises shall forfeit the sum of two hundred dollars for every month of such occupancy and use, and in like proportion for a longer or shorter time, to be recovered by the city treasurer in an action of the case.

"SEC. 3. Any person aggrieved by the order or decree of the board of aldermen under section one of this chapter may, within three days from the service aforesaid thereof upon him, appeal to the common pleas division of the supreme court within and for the county where such city is situated, by filing his reasons of appeal, together with an attested copy of the whole proceedings appealed from, in the clerk's office of said court, and said court if in session shall, or, if not in session, any justice of the supreme court upon application made to him shall, forthwith hear said appeal; and either party to the proceedings may have a trial by jury of all questions of fact, by filing with the clerk of said court a demand for the same at least two days before the day assigned for hearing. In case of such demand, if said common pleas division of the supreme court shall not be in session for the purpose of jury-trials, the clerk shall immediately issue a writ of venire facias directed to the sheriff of the county or his deputy, requiring him to summon twelve jurors, being good and lawful men of the county, to try such issue; and if there shall not be a sufficient number of jurors attending in pursuance of such writ from which a jury may be impaneled, such court or justice shall direct the issuing of other writs of venire facias to complete a jury. If any person aggrieved shall, by reason of accident or mistake, fail to appeal as aforesaid from any such order or decree, and shall make it appear to such court or justice that such failure was caused by accident or mistake, he may at any time within thirty days from the service of the copy of the order or decree aforesaid upon him, appeal from such order or decree and prosecute the same as aforesaid, with the same effect as if done within the said three days.

"SEC. 4. During the pendency of the appeal such trade, occupation or employment shall not be exercised contrary to such order or decree; and upon any violation of such order or decree, the appeal shall forthwith be dismissed.

"SEC. 5. Such court or justice, upon the trial of any appeal, shall give judgment, agreeable to law and in accordance with the fact as found, that such order or decree be affirmed or annulled, or such court or justice may alter or modify the order or decree, or upon a jury-trial the jury may alter or modify the order or decree, and thereupon the verdict and judgment shall have the authority and effect of an original order from which no appeal had been taken. If the order or decree is affirmed, altered, or modified, the city shall recover its costs against the appellant;

if it is annulled, damages by reason of obeying such order or decree of the board of aldermen may be recovered by such appellant against the city, in any court of competent jurisdiction, in an action of the case."[1]

Under this law it appears to be possible to promptly suppress any noxious or offensive trade. Yet ample provision is made for the owners of the property to obtain as prompt justice as possible at the hands of the highest legal tribunal.

In most cities the sanitary inspectors or the executive head of the department manage the regulation of the offensive trades; but in New York special inspectors are employed for this purpose. In 1896, the last year in which a report of the health department was printed, there were two such inspectors, and an interesting account of their work may be found on pp. 204–210 of that report.

Smoke.

The following cities have anti-smoke legislation: Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, District of Columbia, Indianapolis, Kansas City, Louisiana cities of over 5,000 inhabitants, Memphis, Milwaukee, Minneapolis, the City of New York, Omaha, St. Louis, St. Paul, Toledo, Pittsburgh, and Yonkers.

The abatement of the smoke nuisance is usually placed in the hands of the health department. This is quite natural, as most nuisances are referred to that department, but the engineering department with its superior knowledge of mechanical processes might perhaps be better entrusted with it. The health department has jurisdiction in Chicago, Cleveland, Denver, District of Columbia, Kansas City, Memphis, Milwaukee, Minneapolis, New York, and Yonkers. In Cincinnati, Omaha, and New Orleans it is the city engineer, in Indianapolis the inspector of buildings; in Buffalo, St. Louis, and Pittsburgh, the department of public works. The Boston act authorizes the mayor to name the officer who shall be entrusted with its enforcement. It is now in the street department.

There are several types of smoke laws. New York City acts under the following rules of the sanitary code:

"Sec. 134. That the owners, lessees, tenants, and managers of every blacksmith or other shop, forge, coal yard, foundry, manufactory, and premises where any business is done, or in or upon which an engine or boilers are used, shall cause all ashes, cinders, rubbish, dirt and refuse to be removed to some proper place, so that the same shall not accumulate at any of the above-mentioned premises or in the appurtenances thereof, nor the same become filthy or offensive. Nor shall any owner, lessee, tenant, manager, engineer, fireman, or any other person, cause or allow any smoke, cinders, dust, gas, steam or offensive odor to escape or be discharged from any such building, place or premises; and every furnace employed in the working of

[1] Rhode Island, General Laws (1896), Chapter 93.

engines by steam, or in any mill, factory, printing house, dye factory, iron foundry, glass house, distillery, brew house, sugar refinery, bake house, gas works, or in any other buildings used for the purposes of trade or manufacture shall be so constructed as to consume or burn the smoke arising therefrom." [1]

Chicago, Detroit, Omaha, Milwaukee, Minneapolis, St. Paul, and Indianapolis have ordinances very much alike. The following is the Chicago ordinance and under it the health department has done much to suppress the smoke nuisance:

"The emission of dense smoke from the smoke stack of any boat or locomotive, or from any chimney anywhere within the city, shall be deemed and is hereby declared to be a public nuisance; *Provided*, that chimneys of buildings used exclusively for private residences shall not be deemed within the provisions of this ordinance.

"The owner or owners of any boat or locomotive engine, and the person or persons employed as engineer or otherwise in the working of the engine or engines in said boat or in operating such locomotive, and the proprietor, lessee, and occupant of any building who shall permit or allow dense smoke to issue or be emitted from the smoke stack of any such boat or locomotive or the chimney of any building within the corporate limits, shall be deemed and held guilty of creating a nuisance, and shall for every such offense be fined in a sum not less than five dollars, nor more than fifty dollars." [2]

The Detroit[3] ordinance forbids "dense smoke or smoke containing soot or other substances in sufficient quantity to permit the deposits of such soot or other substances on any surface within the corporate limits of the city." The Indianapolis ordinance requires the building inspector to serve a ten days' notice. The Buffalo ordinance is somewhat more explicit in the language employed:

"It shall not be lawful within the limits of the City of Buffalo for any person or persons, firm or corporation, or any servant, agent, or employee of any person, firm, or corporation, to permit or allow, or cause to be permitted or allowed, the discharge or escape into the open air of large quantities of smoke, soot, dust, gas, steam, or offensive odor, or to permit or allow any smoke, soot, dust, gas, steam, or offensive odor to escape in such manner or in such quantities as to cause or have a natural tendency to cause injury, detriment, or annoyance to any person or persons or the public, or to endanger the public, or to endanger the comfort, repose, health, or safety of any person or persons, or the public, or in such manner as to cause or to have a natural tendency to cause injury or damage to business or property." [4]

Section 2 forbids any person, etc., to permit the above. Section 3 forbids the discharge of "fine sand, dirt, or particles of earth or other material." Section 4 makes it the duty of all street inspectors and police to report violations and procure evidence and witnesses.

The Milwaukee ordinance provides that:

"Hereafter, before approving plans and specifications for the erection of any business building or factory within the limits aforesaid, it shall be the duty of the

[1] New York City, Sanitary Code (1899), Sec. 134 as amended 2 November, 1899.

[2] Chicago, Ordinances (1881), Secs. 1650 and 1651.

[3] Detroit, Revised Ordinances (1895), Chapter 90.

[4] Buffalo, Ordinances, Chapter 42, 23 February, 1897.

inspector of buildings of the City of Milwaukee to see that proper provision is made in said plans and specifications to prevent the emission of dense smoke from the chimney of said building."[1]

The Minneapolis ordinance especially mentions not only the engineer but the "general manager, superintendent, yardmaster, or other officer of any railroad company having charge or control of the operation of any locomotive" as responsible for smoke from the same. The Cleveland ordinance is somewhat different from those just referred to. It was only adopted in that city after some adverse decisions under former ordinances:

"Be it ordained by the council of the City of Cleveland, That whoever, as owner, agent, lessee, engineer, fireman, or employe, having charge or control of, or operating any boat, locomotive, stationary engine or boiler, manufactory, building or premises within the corporate limits of the City of Cleveland, and who shall cause, permit, or allow smoke containing unconsumed particles of matter commonly called soot, of such density and volume as to be injurious to health or property, or annoying to the inhabitants of said city, or any part thereof, to issue from any smokestack or chimney of such boat, locomotive, stationary engine or boiler, manufactory, building or premises, or from any smokestack or chimney connected therewith, for more than ten (10) minutes in any one hour shall be deemed guilty of a misdemeanor and shall upon conviction thereof be fined not less than ten dollars nor more than fifty dollars for the first offense, and not less than twenty-five dollars nor more than one hundred dollars for each subsequent offense."[2]

The Denver ordinance authorizes the health commissioner to order the abatement of the smoke nuisance whenever he finds that practicable methods for doing so have been devised:

"Whenever in the opinion of the health commissioner, such apparatus is obtainable as may seem, after a fair trial, to be capable of effectually and economically consuming or destroying smoke from chimneys or other outlets and from furnaces or fires, or when any device for abolishing such smoke shall have been satisfactorily established, the health commissioner shall have power to cause the abatement of such smoke nuisance whenever, in his opinion, it interferes with the comfort or endangers the health of any of the inhabitants of the City of Denver."[3]

The Kansas City ordinance is as follows:

"That dense black or thick gray smoke, issuing from any chimney, flue, smokestack, or from any other source within the corporate limits of Kansas City in such quantities or in such manner as to be deleterious or offensive to health, or productive of physical discomfort, or as to detract from the ordinary enjoyments of life, or be damaging to property, or impair the comfortable enjoyment thereof, is hereby declared to be a nuisance.

"That no person, firm or corporation, shall, within the corporate limits of Kansas City, make, use, keep or maintain any fire in any furnace, engine or device in which fires are used, kept or maintained for any purpose whatever, in such manner as to cause dense black or thick gray smoke to issue in such quantities or in such

[1] Milwaukee, Ordinance of 3 February, 1896, Sec. 3.

[2] Cleveland Ordinance No. 20,550, Sec. 1.

[3] Denver, Ordinance No. 44 of 1893, Sec. 149.

manner as to be deleterious or offensive to health, or productive of physical discomfort, or as to detract from the ordinary enjoyment of life, or be damaging to property, or impair the comfortable enjoyment thereof."[1]

The Louisiana statute requires that within twelve months after passage all steam plants of over ten horse-power shall provide an appliance which shall consume seventy-five per cent. of the smoke.

The act for Boston is as follows:

"In the City of Boston, the emission into the open air of dark smoke or thick gray smoke for more than five minutes continuously, or the emission of such smoke during more than twenty-five per cent. of any continuous period of twenty-four hours is hereby declared a nuisance."[2]

This law applies to whoever commit or suffer the same on any premises owned or occupied by them and upon any one who in any way participates in permitting it.

The Brooklyn act pursued a different method from any thus far given:

"No factory, engine room or electrical station shall use what is known as soft coal for fuel in the furnaces of such factories, engine room or electrical stations within a radius of four miles of the City Hall in the City of Brooklyn, except for the purpose of heating or welding iron or steel; any violation of this act shall subject the proprietors or corporation that shall violate it to a fine of not more than one hundred dollars, the same to be collected by the proper city authorities and placed in the county treasury, and such authorities shall see that this law is enforced."[3]

This act has recently (1899) been sustained by the supreme court in a suit brought against the Nassau Electric Railway Co.

The penalties for violations of these laws are often very considerable, not to exceed $250 in Buffalo, $50 in Milwaukee, $25 per day in Louisiana, $10 to $100 per week in Boston.

Smoke ordinances are of no use unless continued attention is given to their enforcement. In Chicago for a dozen years there has been a special detail of inspectors for this class of nuisances. There are six inspectors at a salary of $1,000 per year; also a chief inspector. Smoke is considered to be dense if the inspector cannot see through it.

The great trouble reported in Chicago[4] is that the boiler capacity of most of the plants is greatly overtaxed. This renders rapid firing necessary and makes the application of consumers difficult. The greatest difficulty was experienced with locomotives and tow-boats; but by persistent labor in 1896, of the 1,408 locomotives entering Chicago 1,281 had been equipped with smoke consumers. The chief inspector,

[1] Kansas City, Ordinance No. 10,168.

[2] Massachusetts, Chapter 389 of 1895.

[3] New York, Chapter 322 of 1895.

[4] Chicago, Report of Department of Health, 1895-6, p. 305.

however, reported that no successful consumer had been devised for marine engines. This form of smoke producer is especially annoying in Chicago where the river passes through such a crowded part of the city.

Cincinnati is another city which has given much attention to the abatement of the smoke nuisance. This work is in that city in the hands of the city engineer. A special report published by him in 1893 stated that the previous year, the first of the enforcement of the law, was chiefly devoted to litigation. The regularity with which offenders were convicted soon produced a spirit of compliance and smoke preventing methods were rapidly adopted. No smoke consuming device is recommended, but the law is enforced and owners of boilers have to select their own methods of prevention.

The following recommendations are printed in a circular issued by the engineer:

"1. Have a hot fire. Give the gas sufficient space and time to burn before the fire is below a red heat.

"2. Fire in small quantities over one part of the grate at a time. The other parts should be closely watched and promptly attended to.

"3. Keep a clean fire all the time. Never keep a set of bare grate-bars in service that are warped and burned, because the air-spaces become closed. Keep the side walls of furnace in good repair, ash-pit free from ashes, and bridge-wall clean and in repair. Do not permit deposits to accumulate back of the bridge-wall.

"4. Clean flues or tubes at least once each day.

"5. Do not delay if draught is not good, but attend to it immediately, as good draught is important in attaining good combustion."

In Cleveland the smoke ordinance was first adopted in 1893. One hundred and twenty notices to abate the nuisance were issued and mostly complied with. The health officer reported that the manufacturers were overrun with agents for smoke consumers. The market was flooded with numberless contrivances, most of them worthless. Mechanical stokers were largely introduced and found very satisfactory. In some cases the evaporation was raised from six and one-half to ten and one-half pounds of water per pound of coal.[1] In January, 1895, a court decision declared the law unconstitutional, and an appeal was made to the legislature for authority to declare what is a nuisance, and a new ordinance was adopted in September, 1896, and the health officer at once proceeded to enforce it. Again, in 1897, the ordinance was thrown out as unconstitutional, and the present ordinance, which was given on another page, was adopted.

All of the cities hitherto referred to have attempted to get rid of the smoke nuisance by encouraging the use of some so called smoke con-

[1] Cleveland. Report of Health Division (1895), p. 7.

suming or smoke preventing device. In 1894 the New York City board of health caused a systematic inspection to be made of all places within the city limits where coal was used for steaming purposes. It was found that while the majority who used bituminous coal were offenders, yet some who used this coal produced little smoke, although they did not use smoke consuming devices. The engineers of these firms were able to so manage their fires as to wholly consume their fuel. The engineer was made to burn all his coal or leave:

"An examination of the method of firing by which all the bituminous coal was consumed was made. The fireman shoveled the coal into the front of the fire-box, where he left it for a short time. Here the more volatile gases were driven off and the dense smoke resulting from the first combustion was produced. The gases and the smoke had then to pass over the bed of live coals, extending to the fire-wall, and in this passage to meet the fresh air coming up from the ash-pit through the grate-bars. As a result, the inflammable gases and the smoke were wholly consumed. The fireman then opened the door, and with his rake moved the now glowing coals back toward the fire-wall and once more shoveled fresh coal to the front of the fire-box, where the process was repeated. This method of firing made the fireman work harder and fire more frequently, but with it every particle of the coal was consumed, and neither the dense smoke nor the "blacks" were produced from the stack."[1]

The board of health, through its inspectors, urged this method of smoke prevention in preference to the use of "preventers," and it is claimed met usually with a favorable reception. It is said that the majority of plants in New York City now emit little smoke. More trouble was found in dealing with the planing mills and other establishments burning shavings and sawdust. Smoke will arise from such even with the most careful firing.

In St. Louis, of 2,453 boilers in 1896–7 there were only 423 not provided with smoke consumers, and these were mostly low pressure boilers used for heating.

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[1] New York, Report of Board of Health (1894), p. 58.

CHAPTER V.

PLUMBING.

THE municipal control of plumbing in the United States dates back less than twenty years. This control was urged primarily by boards of health or persons interested in sanitation, and therefore the enforcement of the earlier plumbing rules was entrusted to the local sanitary authorities. While it would be more logical to vest this function in another department, that of the inspection of buildings, the earlier practice has been adhered to, and at present the control of plumbing is in most cities in the hands of the health department. This custom is doubtless due both to precedent and to the popular notion of the very intimate connection between poor plumbing and disease. Of over one hundred cities which have plumbing rules, in all but about twenty they are administered by the health department.

Of all the important cities considered, only the following have no plumbing code or inspection: Augusta, Ga., Bridgeport, Concord, Dayton, Evansville, Indianapolis, Louisville, Macon, New Orleans, and Wheeling.

A few cities, as Lowell, Mass.,[1] in 1878, Providence,[2] 1878, and St. Louis,[3] in 1880, had some simple plumbing regulations, but the first complete plumbing codes were adopted in 1881. During that year sets of plumbing rules were adopted by Lawrence, Mass., District of Columbia, Brooklyn, and probably Chicago. The first of these adopted were those of Lawrence, 22 July, 1881.[4]

Some of the plumbing codes were adopted in pursuance of statutes enacted for this purpose. The first of these acts was Chapter 133 of the Massachusetts laws of 1877, and the act of 30 May, 1881, of Illinois, empowered cities of over 50,000 to regulate their plumbing and drainage. By the act of 4 June, 1881, of New York, the cities of New York and Brooklyn were authorized to adopt plumbing rules. Most of the plumbing codes have, however, been adopted under the general

[1] *Report of Board of Health* (1878), p. 7.

[2] *Rhode Island*, Public Laws, Chapter 688, Sec. 28.

[3] *Sanitary Engineer* (1880), p. 85.

[4] *Report of Lawrence Board of Health.*

statutory provisions which confer power on local governments to legislate on sanitary affairs. Some of the Massachusetts cities, as Lowell, Lawrence, and New Bedford, adopt their plumbing rules under Public Statutes, Chapter 80, Section 18, which authorizes a board of health to "make such regulations as it judges necessary for the public health and safety." In Maine they are adopted as by-laws "necessary and proper for the preservation of life and health." In New Hampshire plumbing rules are made in pursuance of the statute, which authorizes the health officers to make rules such "as the health and safety of the people may require." In Baltimore plumbing rules are adopted as "necessary for the preservation of the health of the city."

Although it appears to be perfectly competent for cities to regulate plumbing under such general provisions, nevertheless, there have been quite a number of acts, both special and general, conferring this power, and in several instances the local regulations are made a part of the legislative act. Thus the plumbing of Boston[1] and Cincinnati[2] is controlled directly by statute, and Albany, Brooklyn, Detroit, New York, Pawtucket, and Providence adopted plumbing rules in accordance with special acts. At the present time the following states have laws which provide for the local control of plumbing: California,[3] Illinois for cities of over 50,000,[4] Massachusetts,[5] New Jersey,[6] New York,[7] Ohio,[8] Pennsylvania,[9] South Carolina,[10] Washington,[11] and Wisconsin.[12] The following is the Massachusetts law:

"Each city and town of five thousand inhabitants or more in this Commonwealth, and every town having a system of water supply or sewerage, shall by ordinance or by-law, within six months from the passage of this act prescribe rules and regulations for the materials, construction, alteration, and inspection of pipes, tanks, faucets, valves, and other fixtures by and through which waste water or sewage is used and carried, and provide that no such pipes, tanks, faucets, valves, or other fixtures shall be placed in any building in such city or town except in accordance with plans which shall be approved by the board of health of such city or town, or

[1] Massachusetts, Chapter 419 of 1892.

[2] Ohio, Annotated Statutes (1900), Secs. 2575(-53) to (-123).

[3] California, Chapter 14 of 1885.

[4] Illinois, Annotated Statutes (1896), Sec. 290.

[5] Massachusetts, Chapter 477 of 1893, Sec. 6.

[6] New Jersey, General Statutes (1895), pp. 1642, Sec. 39, 1643, Sec. 48, 1644, Sec. 49 (XI).

New York, Revised Statutes (1895), p. 435.

[8] Ohio, Annotated Statutes (1900), Sec. 4238 (-10).

[9] Pennsylvania, Chapter 186 of 1895, and Chapter 133 of 1896.

[10] South Carolina, Act of 5 January, 1895, Sec. 3.

[11] Washington, Code (1899), Secs. 1248–54.

[12] Wisconsin, Statutes (1898), Secs. 959(-23) (-59), 1418a.

such person or persons as said board of health may designate; and shall further provide that no plumbing work shall be done except in the case of repair of leaks, without a permit being first issued therefor upon such terms and conditions as such city and town shall prescribe. The provisions of this section shall not apply to the city of Boston or to any officer or board thereof."[1]

In New Jersey all local boards of health, except township boards, have a similar power, and township boards also when there is a public water supply, but this statute is permissive, not mandatory. In New York there must be established in cities an examining board for plumbers, and this board may formulate in conjunction with the local boards of health a code of plumbing rules. In Ohio the boards of health of cities of 5,000 or of those having a water supply, shall make a plumbing code which shall be approved by the council. The remaining state laws present no very different features. In Pennsylvania the law is mandatory, but is not to apply to cities or boroughs having no public water supply or system of sewerage.

PLUMBING CODES.

In accordance with the various statutory provisions, plumbing regulations have been adopted in almost all the larger cities of the United States, and also in very many of the smaller cities, towns, and villages which are provided with a sewerage system. The intention in the following pages is to present a summary of the local regulations governing plumbing and drainage. The first rule printed under each heading may be considered to be typical of the majority of cities or of the codes most recently adopted. In a general way it may be affirmed that small towns and villages do not appear to need as elaborate a set of rules as larger places: but of communities that have attained the size of 20,000 or over there does not seem to be much difference in the character of the rules adopted, except that in almost all cases the most recent rules are the most stringent and complete. Some of the state boards of health have issued model plumbing laws applicable to the smaller places which may not be able, through their local boards, to give the subject the study required to formulate a good set of rules.

The following are issued by the state board of health of Maine:

"1. Before proceeding to construct any portion of the drainage system of a building, the owner, builder, or person constructing the same shall file with the board of health a plan thereof showing the whole drainage system, from its connection with the common sewer to its terminus in the house, together with the location and sizes of all branches, traps, ventilating pipes and fixtures; and no such work shall be done in any building without the approval of said Board of Health (Health Officer or Inspector).

2. The sewage from each building on every street provided with a common sewer shall be conducted into said sewer; and, if such sewer is not provided, the sewage

[1] Massachusetts, Chapter 477 of 1895, Sec. 6.

shall be disposed of in a manner satisfactory to the Board of Health (Health Officer or Inspector).

"3.— That portion of the house drain which is outside of the building and more than five feet from the foundation walls shall be constructed of iron pipe or salt glazed vitrified drain pipe.

"4.— That portion of the drain-pipe within the building, and outside within five feet of the foundation walls, together with the soil pipe, shall be constructed of cast iron with leaded joints, or of wrought iron with screw couplings. The waste pipe connected with the conductors from the roofs and other pipes inside the building, or outside and within five feet of the foundation walls, shall be constructed of iron with leaded joints, or screw couplings.

"5.— The house drain and other pipes for the conveyance of sewage shall be laid with uniform grade and with a fall of not less than one inch in four feet, except in those cases where the Board of Health may permit otherwise.

"6.— The main house drain shall be provided with a trap, which shall be located just outside or just inside the house walls and beyond all house connections. All pipes connecting a water-closet with a soil pipe shall be trapped, each separately, and close to the connection with each water-closet. All waste pipes shall be trapped, each separately, and close to the connections with each bath, sink, bowl, set of tubs, or other fixture.

"7— All soil pipes shall be carried to their full size through and at least two feet above the roof and left open. A provision shall also be made for admitting air to the house-drain side of the main trap.

"8— The joints in the vitrified pipe shall be carefully cemented under and around the pipe, and the joints in the cast-iron pipe shall be run and calked with lead. Connection of lead pipes with iron pipes shall be made with brass ferules properly soldered and calked to the iron.

"9— All changes in direction shall be made with curved pipes, and all connections shall be made with Y branch pipes. All joints and pipes shall be made air-tight. The whole work shall be done by skillful mechanics in a thorough and workmanlike manner, and satisfactorily to the Board of Health (Health Officer or Inspector).

"10.— All drains now built shall be reconstructed, whenever in the opinion of the Board of Health it may be necessary.

The state board of health of Connecticut has formulated a somewhat more elaborate code which may be found on page 298 of their report for 1894. New Jersey has a model code for which see state board of health circular LXV. Pennsylvania and Ohio also have sets of model rules.

The following is a summary of the plumbing regulations of the more important cities:

Plans and Specifications.

"Before the construction, reconstruction, alteration or repair (except as hereinafter provided) of any portion of the plumbing and drainage system of any building, suitable plans of all work proposed to be done shall be filed at the office of the Commissioner of Health by the architect, or by the owner or agent of the property."[1]

The builder or other duly authorized person, or plumber, or every person doing plumbing work, are occasionally named and sometimes it

[1] Brooklyn, Sec. 1.

[This chapter was written before Brooklyn became a part of New York, and at that time the plumbing code of Brooklyn was one of the most complete.]

is not specified. Who shall file plans, but the requirement is impersonal, "plans shall be filed."

Plans and Inspection.

"For the best interests of all parties concerned, the architects are required to notify the inspector of plumbing, whenever they have any plans completed for buildings to be erected in the city, so that the inspector may examine the plans and suggest or alter them before the plumbers agree on the plumbing work."[1]

"Plans will not be required in cases of removal of stoppages, repairs of leaks, and repairs of or alterations to tanks, kitchen boilers or faucets."[2]

"Plumbing work which does not add additional fixtures or cause the entire renewal or relocating of any soil or waste pipes or changing of the system of using such pipes shall be considered a repair."[3]

Such are the exemptions from the requirement of plans. In Somerville the work which requires plans and is subject to the provisions of the rules is more carefully denned:

"The rules and regulations in this ordinance contained are prescribed for the materials, construction, alteration and inspection of all pipes, fittings, tanks, faucets, valves, and other fixtures by and through which waste water or sewage is used and carried and no such pipes, tanks, faucets, valves, materials, or other fixtures shall be placed in any building in this city except in accordance with plans which shall before such placing of any such fixtures be submitted to and approved by the inspector of buildings, and which shall conform to the provisions of this ordinance."[4]

"Where a number of buildings are situated together on one street, and the plumbing is the same in each and to be done under the same contract, one plan will be permitted for all the buildings. In such case a general plan must be submitted, showing all the houses, and the location of the main drain for each house."[5]

In Asbury Park the "plans and drawings shall be drawn to scale in ink on cloth, or they must be cloth prints of such scale drawings." The Albany rule requires that the drawings shall be of a uniform size, $8 \times 12\frac{1}{2}$ inches, or $16 \times 12\frac{1}{2}$ inches.

"Drawings and descriptions of the drainage of buildings erected prior to 1886 may be placed on file in the office of the Board of Health.

"When the drainage of buildings erected prior to 1886 has been inspected and condemned, plans must be filed, and the new work or alterations shall be executed in accordance with these rules and regulations."[6]

In the City of New York and a few other cities, actual plans drawn to scale are required and are kept on file. In many others, perhaps in the majority of cities, the inspectors claim that the requirement of such

[1] Milwaukee, Sec. 5.
[2] Brooklyn, Sec. 3.
[3] Cincinnati, Sec. 18.
[4] Somerville, Sec. 10.
[5] Brooklyn, Sec. 4.
[6] Philadelphia, Rules 5 and 7.

plans is an unnecessary hardship, and that the inspector can understand the essentials of the scheme perfectly well without them. Moreover, it is claimed that even with the best plans slight deviations will be made in the arrangement of pipes so that for purposes of future reference such plans have much less value than was hoped for. Hence in many cities, even where plans are called for by the rules, the letter of the rule is not enforced and specifications only are required.

In Appendix 39 is shown the form of specification, or rather description, which is one of the simplest, and is used in Denver. The more elaborate Providence specification also is shown in Appendix 40. In other cities the printed specifications provided for the use of plumbers are much more complete. In Asbury Park a pamphlet four by eight inches of forty pages is provided with much printed description of the plumbing, specifying construction in accordance with the city regulations and leaving few blanks to be filled by the plumber. All of these plans and specifications have spaces for the approval of the inspector or other officer.

Approval of Plans and Permits.

"Plans and specifications will be approved or rejected within a reasonable time from the date of filing. In case of disapproval, the one filing the plan will be notified, in writing, of the reasons for such disapproval."[1]

The time for approval or disapproval is often fixed, from twenty-four hours in Pittsburgh to ten days in Philadelphia. Usually it is forty-eight hours.

"If the work is not begun under the approved plans within six months from the date of approval, such plans must be again presented for approval. Plans are approved under the condition that such approval expires by its own limitations within six months from the date of approval; and where one plan has been submitted for more than one building, this rule shall apply as to each of said buildings as if said plan had been filed for such building only.

"No change or modification of the approved plans will be permitted unless such change or modification be authorized by the owner or agent, submitted to the Commissioner of Health and approved and placed on file as in the case of original work.

"No portion of the plumbing or drainage work shall be executed until the above mentioned plans and description thereof shall have been approved by the Commissioner of Health."[2]

Besides the approval endorsed on the plans and specifications, a notice of approval or a permit for work is issued in many cities, and in some cities a fee is charged for these. The fee varies from fifty cents in San Francisco to two dollars in New Jersey cities. In Philadelphia the fee is one dollar, and, owing to the large number of plans of old plumbing filed, the department is self-sustaining, $13,756 having been

[1] Brooklyn, Sec. 6.

[2] Brooklyn, Secs. 8, 9, and 7.

received in 1899. In Providence the "approval" is in the form of a postal which is mailed to the plumber.

Some system must be followed in the inspector's office in keeping run of the work. In Providence all plans of work in course of construction are kept in a cabinet indexed under the name of the plumber. When the work is completed the plans and all other papers are filed numerically. Besides this four record books are kept. In the first book the plans are entered consecutively, numbered, with name of street, name of plumber, dates of filing, approval or rejection of plan, application for inspections, and inspection, page of street index, and remarks. A second book is simply a street index. In a third book is recorded the daily work of the office in inspections, etc. In the last book the description and application with endorsement are entered as a permanent record.

Materials and Workmanship.

"All materials used in the work of plumbing and drainage must be of good quality and free from defects; the work must be executed in a thorough and workmanlike manner." [1]

Deviation from Rules Permitted.

"Deviations and variations from these rules will be allowed when desired if in the opinion of the board of health they will not be or be liable to become, a source of danger to the public health." [2]

In the District of Columbia, Section 15, such permission may only be given in writing.

"The plumbing inspector shall use his discretion and his decision shall be final in regard to work in old and new buildings which cannot be governed by the rules." [3]

In Somerville, Mass., deviations are not allowed in buildings to be used as dwellings or places of business.

Connection with Sewer.

"Every house and building must be separately and independently connected with the street sewer, except in cases where there may be a house in the rear of the lot where it may be connected with the sewer of the house in front. A house or building shall be defined as an architectural structure covered by one roof and enclosing walls.

"Porches or the continuation of porch roofs from building to building shall not be considered as a portion of the main structure." [4]

"Every building provided with water from the city or other water supply shall have a waste pipe, for the conveyance of waste water and sewage, connected with the public sewer or with a particular sewer, or, if there is no such sewer, with a cesspool, constructed as aforesaid as the inspector of buildings or board of health shall require. No drain or sewer from any building shall, without the approval of the inspector of buildings, pass under another building." [5]

[1] Brooklyn, Sec. 14.

[2] Hartford, Sec. 49.

[3] Cleveland, Sec. 27.

[4] San Francisco, Sec. 4.

[5] Somerville, Mass., Sec. 13.

In Portland and Reading a separate connection must be made if feasible. In Scranton, in case there are two buildings on one lot, a single sewer connection may be allowed if there is a separate trap and fresh air inlet for each building. In Somerville, Mass., "a block of two houses may be connected with the public sewer through one pipe, connections being made five feet outside of the building."

The control of the drain in the street to the lot or curb line is usually in the hands of the department which builds and maintains the sewers, and as this is rarely the health department, and as the regulations governing this work are not often found in plumbing codes, they will not here be considered.

Size of Drain.

"House sewers shall be of not less than the following sizes, and no sewer shall be smaller than the soil-pipe it serves:

When fall is ¼ inch to a foot.		When fall is ½ inch to a foot.	
Area of Lot to be Drained.	Size of Sewer.	Area of Lot to be Drained.	Size of Sewer.
2,000 sq. ft.	4 inches.	2,500 sq. ft.	4 inches.
3,000 "	5 "	4,500 "	5 "
5,000 "	6 "	7,500 "	6 "

"No house sewer shall be larger than six inches in diameter. Where the area to be drained is larger than given in the table, several sewer connections shall be used." [1]

"Each house sewer shall consist of a separate drain pipe of iron or vitrified stone ware of the size specified in the following table for the various areas, the total area of the lot to be drained being taken to determine the size of the house sewer:

SIZE OF HOUSE SEWER.

Area to be drained.	Inside diameter of house sewer.		Least fall.
Square feet.	Iron.	Vitrified Pipe.	
100 to 2,500	4″	5″	1″ in 40″
2,500 to 4,000	5″	5″	1″ in 48″
4,000 to 10,000	6″	8″	1″ in 60″

"No house sewer greater than six inches inside diameter shall be allowed without the written approval of the superintendent of sewers." [2]

[1] Brooklyn, Sec. 16.

[2] District of Columbia, Sec. 70.

[illegible] Lawrence, and Portland, Me[illegible] maximum limit, except that in [illegible] In Hart[illegible] In [illegible] four inches is invari[illegible] specified that it shall [illegible] In Lawrence it must [illegible] the diameter is to be such as

[illegible] up to within a short [illegible] nor allowable except

[illegible] which is meant the [illegible] the room wall, must be of [illegible] at least may approve. Such [illegible]

[illegible] has been filled within

[illegible] cemented [illegible] and closer than ten feet [illegible] the surface of the [illegible] be laid in bad or [illegible] must be of extra heavy

[illegible] lay the tile drain [illegible] Brooklyn above, it [illegible] This distance [illegible] in Providence and [illegible] Lawrence, New Bed[illegible] six feet in the large [illegible] and ten feet in Somer[illegible] In Worcester the drain must be iron if less than [illegible] below the surface of the ground. In the District of Columbia tile pipe can only be used if connection is made towards the [illegible]

[illegible] requires extra heavy iron pipe within the cellar walls, but [illegible] in Providence and Cincinnati, tile is allowed under certain [illegible] In Cincinnati it may be used when the soil is a [illegible]

"Outside of building, where the ground is of sufficient solidity for a proper foundation, cylindrical terra-cotta pipe of the best quality, free from flaws, splits or cracks, perfectly burned and well glazed over the entire inner and outer surfaces, may be used if laid on a smooth bottom with a special groove cut in the bottom of the trench for each hub, in order to give the pipe a solid bearing on its entire length, and the soil well rammed on each side of the pipe. The spigot and hub ends shall be concentric. The space between the hub and the pipe must be thoroughly filled with cement mortar, made of equal parts of the best American natural cement and bar sand, thoroughly mixed dry and enough water afterward added to give it proper consistency. The mortar must be mixed in small quantities and used as soon as made.

"The joints must be carefully wiped out and pointed, and all mortar that may be left inside removed, and the pipe left clean and smooth throughout, for which purpose a swab must be used."

In Albany the drains must be laid with the hub end up hill. In Asbury Park the drain must be laid on boards six inches by one inch, or if over eight inches in diameter, the plank must be six inches by two inches. In Milwaukee "back filling is to be first hand packed with care and then well rammed to prevent the slightest setting of the drain." In Lawrence a drain cannot be laid in the same trench as a sewer or water pipe or within four feet of the line of the same. In Milwaukee the distance is eighteen inches.

"Old sewers or house drains can be used for new houses only when found by an Inspector of this Department to conform in all respects to the regulations governing new sewers and drains."[1]

Soil and Waste Pipes, Size.

Soil pipes are never to be less than four inches in diameter. In Lawrence, if there are four water-closets, and in New Bedford, if three or more closets discharge into it, the soil pipe must be five inches in diameter.

"In all buildings having three (3) stories the diameter of vertical soil pipes shall be one (1) inch greater from a point one (1) foot below the roof than that of the pipe proper, and the increased size of pipe shall continue through and above the roof.

"In buildings having more than three (3) stories, vertical soil pipes shall be increased one (1) inch in diameter at each twenty-five (25) feet or elevation above the third story."[2]

"Traps and branch waste pipes shall be of the following sizes:

For basins and pantry sinks	1½ inches.
Slop sinks	3 "
Kitchen sinks	1½ or 2 "
Bath tubs	1½ or 2 "
Urinals	1½ or 2 "
Laundry tubs	1½ or 2 "
Water-closets	4 "[3]

[1] City of New York, Sec. 17.

[2] District of Columbia, Sec. 88.

[3] Brooklyn, Sec. 36.

In Scranton and Reading one and one-quarter inches is allowed for basins, pantry, and kitchen sinks. In Hartford basins may have one and one-quarter inch pipes. In Lawrence it is specified that these are inside measurements, and pipe must be gauged by the plumbing inspector. In Cleveland a stack for wastes must never be less than two inches. In Hartford two fixtures require a one and one-half inch pipe. In Haverhill and New Bedford two fixtures require a two-inch pipe, and in Fitchburg two to six fixtures a two-inch pipe, and over six fixtures a three-inch waste pipe. In the New Jersey cities five sinks require a three-inch pipe. In Brooklyn eight fixtures require a three-inch pipe, three to seven fixtures a two-inch pipe, and three fixtures one and a-half inch pipe. In New Bedford and Hartford horizontal waste pipes for sinks must be three inches in diameter.

Soil and Waste Pipes, Material.

"Sewer pipes above the ground and all soil, waste, and vent pipes shall be of extra heavy cast iron or heavy wrought iron or steel pipe. Wrought iron pipe shall be asphalted, galvanized or otherwise made rustless. Lead pipes will be allowed only in short lengths and when they are exposed to view. If nickel-plated or polished brass pipes are used, they shall be of iron-pipe size and of heavy pipe. No brass pipe less than $\frac{3}{64}$ of an inch in thickness will be allowed." [1]

"All drain and anti-syphon pipes of cast-iron shall be sound, free from holes, and of a uniform thickness, and shall conform to the following relative weights:

Standard.		Extra Heavy.	
2 inch pipe,	4 lbs. per foot.	2 inch pipe,	5½ lbs. per foot.
3 " "	6 " "	3 " "	9½ " "
4 " "	9 " "	4 " "	13 " "
5 " "	12 " "	5 " "	17 " "
6 " "	15 " "	6 " "	20 " "
7 " "	20 " "	7 " "	27 " "
8 " "	25 " "	8 " "	33½ " "
10 " "	35 " "	10 " "	45 " "
12 " "	45 " "	12 " "	54 " " [2]

Ordinary iron soil pipe is permitted in place of the extra heavy under certain conditions in many cities. Thus in Providence, Somerville, New Haven, and Philadelphia, only soil pipe below ground need be extra heavy. In Cleveland and San Francisco extra heavy is required in buildings of over four stories. In Manchester, N. H., soil pipes carrying discharges from water-closets must be extra heavy. In Cleveland and Providence the thickness of standard ordinary pipe is specified, four-inch pipe one-eighth of an inch thick, five to six-inch pipe five-thirty-seconds of an inch thick, and a proportional thickness for greater diameters.

[1] Brooklyn, Sec. 25.

[2] Philadelphia, Rule 23.

"All wrought-iron and steel pipe must be equal in quality to "standard," and be properly tested by the manufacturer. All such pipe must be lap-welded, and shall be galvanized. No plain black pipe will be permitted. Each length of said pipe shall have the weight per foot and maker's name stamped upon it. Fittings for wrought iron or steel vent pipes may be cast or malleable steam and water fittings. Fittings for waste or soil pipes must be the special, extra heavy cast-iron recessed and threaded drainage fittings, with smooth interior water-way, so as to give a uniform grade to branch of not less than one-quarter of an inch per foot. All joints shall be screwed joints, made up with red lead, and the burr formed in cutting must be carefully reamed out. The pipe shall not be less than the following average thicknesses and weight per lineal foot:

Diameters.	Thicknesses.	Weight per lineal foot.
1½ inches	.14 inches	2.68 pounds
2 inches	.15 inches	3.61 pounds
2½ inches	.20 inches	5.74 pounds
3 inches	.21 inches	7.54 pounds
3½ inches	.22 inches	9.00 pounds
4 inches	.23 inches	10.66 pounds
4½ inches	.24 inches	12.34 pounds
5 inches	.25 inches	14.50 pounds
6 inches	.28 inches	18.76 pounds [1]

In Detroit "wrought iron or steel pipe of one and a half inch or more in diameter must be but-welded and smaller sizes lap-welded."

"All cast-iron pipe used shall have cast upon it, directly back of the hub of each section, the weight per lineal foot and the name of the manufacturer, in characters not less than one-half (½) inch in length." [2]

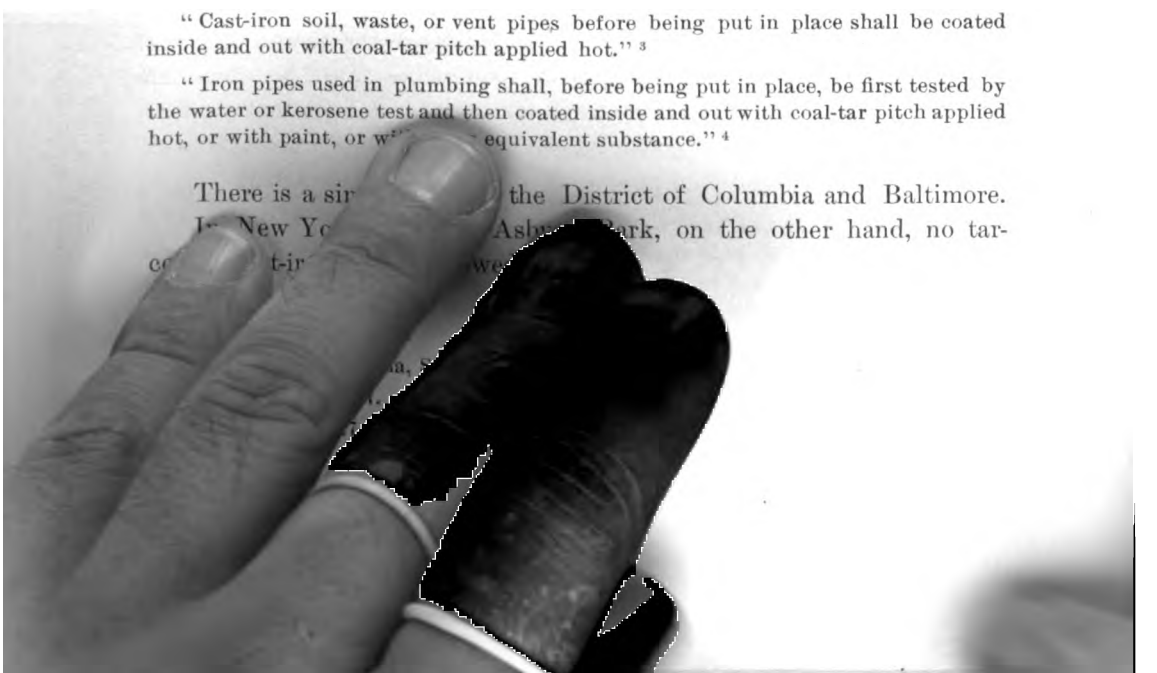
In Philadelphia considerable pipe has recently been found which was of less weight than indicated by the figures upon it.

The question of tarring cast-iron pipe is treated differently in different cities. Often, as above, it is merely required that iron pipe shall be asphalted or tarred. In Cincinnati, Milwaukee, Providence, and Rochester the pipe must be tarred before putting up:

"Cast-iron soil, waste, or vent pipes before being put in place shall be coated inside and out with coal-tar pitch applied hot." [3]

"Iron pipes used in plumbing shall, before being put in place, be first tested by the water or kerosene test and then coated inside and out with coal-tar pitch applied hot, or with paint, or w[illegible] equivalent substance." [4]

There is a sir[illegible] the District of Columbia and Baltimore. I[illegible] New Yo[illegible] Ash[illegible]rk, on the other hand, no tar-co[illegible] t-ir[illegible] we[illegible]



Metal pipes are not always admissible, hence in Providence:

"Soil and waste-pipes and their branches shall be of iron, lead, or brass, except in manufacturing establishments where acids are used, in which case such material shall be used as shall be approved by said inspector." [1]

In the City of New York all fittings used with iron pipe "shall correspond with it in weight and quality."

"All lead pipes, bends, and traps must be drawn and of not less than the following weights per lineal foot:

1½	inches	3½ pounds
2	"	5 "
3	"	6 "
4	"	8 " [2]

In Hartford and Providence one and one-half inch pipe may weigh three pounds, and in New York City and Scranton two-inch pipe may weigh four pounds.

"All brass pipe for waste and vent pipes and solder nipples must be thoroughly annealed, seamless drawn brass tubing of standard iron pipe guage. Connections with said brass pipe and between brass pipe and traps, or between brass pipe and iron pipe must not be made with slip joints or couplings. Threaded connections on brass pipe must be of the same size as iron pipe threads for the same size of pipe and be tapered. The following average thicknesses and weights per lineal foot will be required:

Diameters.	Thickness.	Weights per lineal foot.
1½ inches	.14 inches	2.84 pounds
2 inches	.15 inches	3.82 pounds
2½ inches	.20 inches	6.08 pounds
3 inches	.21 inches	7.92 pounds
3½ inches	.22 inches	9.54 pounds
4 inches	.23 inches	11.29 pounds [3]

As shown in rule 25 of Brooklyn, given above, lead waste pipe is usually allowed in short lengths. In San Francisco it may "be used only as branches to connect with cast or wrought iron; said branches shall not exceed five feet in length." In Hartford the length may be six feet. In Lowell waste pipes over two inches must be iron. In Reading "lead wastes may be used for horizontal lines that are two inches or less in diameter."

Joints in Pipes.

"Joints in earthen pipe shall be made with pure cement.

"Joints in cast iron pipe shall be made with pure lead, well caulked, and no paint, varnish or putty will be allowed until the joints have been tested.

"Joints in wrought iron or steel pipe shall be screw joints.

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[1] Providence, Sec. 5.

[2] klyn, Sec. 37.

[3] Park, Sec. 33.

"Joints in lead pipe shall be in all cases wiped or overcast.

"Joints between lead and iron pipes shall be made by extra heavy cast, or preferably drawn, brass screw nipples, or with such caulking ferrules of the full size of the iron pipe. The thickness of all brass thimbles or ferrules shall be at least one-eight of an inch."[1]

" . . . Brass ferrules must be best quality, bell shaped, extra heavy cast brass, not less than four inches long and two and one-quarter inches, three and one-half inches, and four and one-half inches in diameter, and not less than the following weights:

Diameter.	Weight.
2¼ inches	1 pound, 0 ounces
3½ inches	1 pound, 12 ounces
4½ inches	2 pounds, 8 ounces

"One and one-half-inch ferrules are not permitted. Soldering nipples must be heavy cast brass, or of brass pipe, iron pipe size. When cast they must not be less than the following weights:

Diameters.	Weights.
1½ inches	0 pounds, 8 ounces
2 inches	0 pounds, 14 ounces
2½ inches	1 pound, 6 ounces
3 inches	2 pounds, 0 ounces
4 inches	3 pounds, 8 ounces[2]

In Providence joints in earthen pipe shall be made with Portland or hydraulic cement and sand in proper proportions and in Pittsburg, as above, the proportions of cement and sand are specified.

In the joints of cast iron pipes, Rochester requires not less than twelve ounces of lead for each inch of the diameter of the pipe so connected. A few cities permit "rust joints carefully and properly made." In New Bedford they must be one and one-half inches deep. In Philadelphia they may be of "cement made of iron filings and solammoniac, so as to make them gas tight."

In Manchester, N. H., Fall River and Haverhill, joints in lead pipe are to be wiped joints "when practicable." Screw joints must be made up with red lead or be steam tight. In Manchester, Portsmouth, Haverhill, and New Bedford saddle hubs are forbidden and in the District of Columbia "no soil or waste pipe shall be tapped." In Lawrence saddle hubs are allowed when it is impossible to connect otherwise. In New Bedford double hubs are prohibited on all cast iron soil or waste pipes. In Hartford rubber vent couplings and brass vent unions for lead and iron pipe will not be allowed under any circumstances. In Fitchburg "combination brass ferrules with ground joints may be used."

Pitch.

"The inclination of water-closet, kitchen and all other drains not over six inches in diameter, liable to receive solid substances, shall not be less than one-half an inch

[1] Brooklyn, Sec. 29.

[2] Asbury Park, Sec. 33.

in two feet; and of cellar or other drains, to receive water only, one-quarter of an inch in two feet."[1]

The same is found in Milwaukee and Cleveland. In Albany the drain inside the house may have a pitch of one-eighth inch per foot and outside the house one-quarter inch per foot. Usually one-quarter inch per foot is the minimum pitch allowed. In the District of Columbia the minimum pitch for a drain is one-fifth inch per foot and the rules further prescribe that:

"No house sewer shall be laid with a less fall than required by this table, or with a greater fall at or within four (4) feet of the junction with the main sewer than two (2) inches vertical in three (3) inches horizontal.

"The limits of grade specified are intended to apply only to extreme and unusual cases; in all ordinary cases a practically uniform grade shall be preserved from a point five (5) feet exterior to the building served or the building line thereof to the junction with the main sewer."[2]

Changes in Direction.

In Lowell changes in direction of soil pipes shall be made with slow curves.

"The arrangement of drain, soil, waste and vent pipes must be as direct as possible. All changes in the direction of drain, soil or waste pipes shall be made with Y branches, 1-16, 1-6, or 1-8 bends. Offsets may be used, *provided* the angle they present is not less than that represented by a 1-6 bend."[3]

In Brooklyn offsets must "be made with forty-five degree bends or similar fittings," and in that and some other cities "the use of T-Y's will be permitted on upright lines only.

Openings for Pipes.

In Boston the "drain shall not be subjected to pressure where it passes through a wall."

In Pittsburg, when the house drain passes through a new foundation wall, a relieving arch shall be built over it with a two-inch space on either side of the drain. In Fall River there must also be a two-inch space on top; and in the District of Columbia "there shall be built into the wall during its construction an iron pipe not less than two inches in diameter greater then the pipe proposed to be run."

"Wherever pipes pass through floors, the openings in both floors and ceilings shall be tightly closed to prevent the passage of air currents from one story to another, or from the pipes into the ceiling spaces in a horizontal direction."[4]

Supports for Pipes.

"Whenever practicable, sewer pipes within the buildings shall be supported by substantial brick piers, or properly secured to walls, or suspended to floor timbers

[1] Providence, Sec. 10.

[2] District of Columbia, Sec. 70.

[3] San Francisco, Sec. 2.

[4] Brooklyn, Sec. 42.

by strong iron hangers. When sewers are necessarily laid below the floor, brick manholes shall be built to give access to all handholes." [1]

In Portland "they may be laid in a brick or cemented trench in the cellar bottom."

". . . When required by the inspector of buildings, drain pipes below a cellar floor shall be laid in a brick trench with a concrete bottom, and shall be accessible through sufficient unattached covers." [2]

In Boston this is the rule in every instance.

Supports.

In Manchester, N. H., when any floor other than earth is to be laid over a pipe in a basement or cellar it must be laid in a trench. In Philadelphia "it may be constructed along the foundation walls above the cellar floor, resting on nine (9) inch brick piers laid in cement mortar, said piers to be not more than seven (7) feet apart, and securely fastened to said walls."

"All soil and waste pipes shall be properly fastened and secured with either heavy wrought iron straps or hooks. If hooks are used they shall be forged out of one piece of iron, not welded." [3]

"Wrought iron hangers (double hangers), one-half inch in diameter, will be required for five and six inch pipe, three-eighths inch for three and four inch pipe, and one-quarter inch for two inch pipe. Hangers, clamps, or suitable brick piers must be placed at intervals of seven and one-half feet." [4]

In New Haven and Haverhill supports may be ten feet apart, and in Scranton there must be a support for every length of pipe. In Asbury Park the use of pipe hooks for supporting pipes is prohibited.

"All connections of lead supplies, waste, vent, or flush pipes shall be made by means of wiped joints, and shall be supported their entire length by means of lead tacks or clips screwed to boards provided for the purpose." [5]

In Hartford and Rochester vertical soil pipes must rest on a pier or foundation.

Exposure of Pipes and Fixtures.

"The drain, soil, and waste pipes, and the traps must, if practicable, be exposed to view for ready inspection at all times and for convenience in repairing. When necessarily placed within partition or in recesses of walls, soil, waste pipes should be covered with woodwork so fastened with screws as to be readily removed; in no case shall they be absolutely inaccessible. It is recommended to place soil and other vertical pipes in a special shaft between or adjacent to the water closets and bath room, and serving as a ventilating shaft for them. This shaft should be at least two

[1] Brooklyn, Sec. 18.

[2] Somerville, Sec. 20.

[3] San Francisco, Sec. 14.

[4] Hartford, Sec. 16.

[5] Hartford, Sec. 38.

and one-half feet square. It should extend from the cellar through the roof, and should be covered by a "louvered skylight," it should be accessible at every story and should have a very open but strong grating at each floor to stand upon. Shafts not less than three square feet in area are required in tenement houses to ventilate interior water-closets." [1]

In Reading, when sewers are below floors, manholes must be provided to give access to the cleansing branches.

"No soil pipe shall be run up outside of any building, or between the studdings or between the walls of rooms.

"Where a lead waste, or ventilation pipe, passes through between the floors, ceiling or other places accessible to rats, such pipes must be encased with sheet tin, copper or galvanized iron." [2]

In Milwaukee no soil or waste pipe shall be placed in a recess in the outside wall. In the District of Columbia "all soil, drain, waste, and vent pipes shall be located inside of buildings. In Brooklyn the enclosing of water-closets with wooden casing will not be permitted.

"The space in and around water-closets, and wash bowls, shall not be enclosed by woodwork, but shall remain open and exposed to view, except that a closet may be made under a wash bowl, when provided with a suitable door." [3]

"In tenement and apartment houses sinks must be entirely open and placed on iron legs or brackets without any enclosing woodwork." [4]

Cleanouts.

"Cleanouts shall be placed in horizontal drain and waste pipes close to Y branches, and at every right angle turn in the drain. All traps shall be provided with suitable accessible openings for cleaning purposes, and all such openings or cleanouts shall be exposed to view. Traps with covers depending on putty connections to make them tight are prohibited." [5]

In New Bedford cleanouts must be placed where the inspector may designate and shall be approved by him.

"Cleanouts for inspection purposes, corresponding in size with the drain or waste pipe, with covers to handholes made gas and air tight, and of a pattern approved by the board of health, shall be provided at intervals of not more than twenty feet, and one such opening shall be requred at each horizontal branch of fifteen feet; and on all pipes laid beneath the ground said cleanouts must be in bricked and cemented pits, and easy of access." [6]

In Detroit cleanouts must be brought up to floor level with branches and curves.

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[1] Cleveland, Rule 4.

[2] Lawrence, Sec. 4, Rule 5, and Sec. 6, Rule 9.

[3] Worcester, Sec. 15.

[4] Asbury Park, Sec. 22.

[5] Hartford, Sec. 6.

[6] Haverhill, Sec. 10.

"Each vertical soil pipe shall be provided near its lower end with a T branch, suitably located, and having a cast-iron plug not less than four inches in diameter leaded in."[1]

In Asbury Park cleanouts must not be more than twenty-five feet apart and the main trap and cleanout must be in an eight-inch brick well with iron or stone cover if in the cellar:

"Brass screw caps for cleanouts must be extra heavy, not less than one-eighth of an inch thick, and must have a flange of not less than three-sixteenths of an inch thick. The screw cap must have a solid square, or hexagonal nut not less than one (1) inch high, with a diameter not less than one and one-half (1½) inches. The body of the cleanout ferrule must not be less in weight and thickness than the caulking ferrule for the same size of pipe. Where cleanouts are required by the rules and by the approved plan the screw cap must be of brass. The engaging parts must have not less than six (6) threads of iron pipe size and be tapered. Cleanouts must be of full size of the trap up to four (4) inches in diameter, and not less than four (4) inches for longer traps."[2]

Termination of Pipes at Roof.

"All soil and waste pipes shall be carried undiminished in size to a height at least two feet above the roof, except in the case of roofs of tenement houses or roofs used for drying purposes, in which case they shall extend seven feet above the roof and be suitably braced. Such pipes shall terminate at a point approved by the commissioner of health. Pipes on extension roofs when within twenty feet of any window, shall be carried up and continued above the main roof, and where necessarily carried up on the outside of the main building, they shall have a diameter of not less than four inches. There shall be no caps, cowls, ventilators or return bends put on the ends of the pipes above the roof, and the mouths of all such pipes on the roof shall be kept wide open. The size of all pipes shall be increased one inch from a point just below the roof to the terminal of the pipe above the roof, but no pipe above the roof shall have a diameter less than four inches. Iron, brass or copper wire baskets will be permitted in the mouths of pipes to keep out obstructions. Vent pipes may be carried above the roof in the same manner as soil and waste pipes, or they may be connected with a soil or waste pipe above the highest floor."[3]

The height to which the pipe must be carried varies in different cities. In Brooklyn, as above, and Somerville and Portsmouth, N. H., it is two feet. In Bridgeport, Chicago, Cincinnati, Cleveland, Lawrence, and New Bedford it is one foot. In Denver the soil pipe must be carried to a height six inches above the ridge or the fire wall, if the roof is flat; in San Francisco, two feet above the highest line of roof or coping. The soil pipe is to be increased one inch in diameter one foot below the roof in Chicago, and two feet below in Fall River. In Cleveland the soil pipe is to be one size larger where it passes through the roof and never less than four inches. In Rochester the soil pipe must be three feet above any window and five feet from any chimney. In

[1] District of Columbia, Sec. 89.

[2] Asbury Park, Sec. 33.

[3] Brooklyn, Sec. 33.

Portsmouth, N. H., it must extend five feet above the roof if fifteen feet from a window, and in Somerville and New Haven if ten feet from a window; and in the New Jersey cities if twenty feet from a window it must extend above the main roof. In New Bedford it must be away from all windows. In Lawrence it must be two feet above the highest opening in the building. In Lowell "said roof opening must be at a point where it cannot ventilate into a window of any dwelling." In Albany the soil pipe is to be one inch larger above the roof and is only required to extend two feet when it receives discharges from fixtures on two or more floors. In Paterson and Hartford if in flat tenement roofs the pipe must extend six feet, and in Reading five feet. In Cleveland if in an ell it is to extend above the main roof. In Lowell it must be as high as the ridge pole. In Providence it must be carried to such a height as the inspector may direct. In Fall River "all branches of soil pipe ten feet or more in length shall be continued full size through the roof or be taken into the soil pipe above the highest fixtures unless otherwise permitted." In Haverhill soil pipes of ten feet and waste pipes of fifteen feet length must be carried separately through the roof

Rain-Water Leaders.

"Rain-water leaders must never be used as soil, waste or vent pipes, nor shall any soil, waste or vent pipe be used as a leader. Where the leader is within the house it must be of extra heavy cast iron pipe with leaded joints, or of heavy asphalted or galvanized wrought iron pipe with screw joints. When outside the house, if of sheet metal, with slip joints, and, if connected with the drain, it must be trapped beneath the ground or just inside the wall, the trap being arranged so as to prevent freezing. In every case where a leader opens near a window or light shaft it must be properly trapped at its base. The joint between inside iron leaders and the roof must be made tight by means of a brass ferrule and lead or copper pipe, properly connected to rain-water inlet head on roof." [1]

In Albany leaders are to be trapped only when they open within twenty feet of a window, and in Hartford and San Francisco the distance is ten feet. In Hartford "all leader drains from two feet above the ground to the distance of six feet from the outside of the cellar walls of buildings shall be of extra heavy cast-iron pipe." In San Francisco leaders must be of cast-iron five feet above the ground. In Haverhill they must enter the drain at such a point and in such a manner as to prevent syphoning. In San Francisco "the connection between cast-iron and sheet-iron leader pipe is to be made with brass ferrules soldered to leader and caulked into cast-iron."

"Drains from rain-water leaders shall connect with the sewer outside of house trap with a cast-iron 'Y' branch trap and cleanout, and if properly supplied with clear water from flushing tank to maintain seal in trap, may be of first-class vitrified

[1] Brooklyn, Sec. 23.

pipe, provided that all rises to, and at least eight inches above grade, shall be of cast-iron." [1]

"All leaders from points below line of main roof must discharge into open trapped hoppers, and said hoppers supplied from suitable interior fixture, same as above provided for in surface drains." [2]

Main Trap.

"A running or P trap, of form approved by the Inspector of Plumbing, shall be placed on every house sewer, except where there is no plumbing fixture located within the building under or through which the house sewer is laid. Such trap shall be placed at an accessible point, if practicable within the wall of the building, and a vertical pipe of the same diameter, and provided with a brass trap screw, shall be constructed over the trap to admit of cleaning the same.

"A brick manhole provided with cast-iron frame and air-tight cover may be used in lieu of the vertical pipe to afford easy access to the trap." [3]

In Pittsburgh it is provided that the trap must be inside the building, in which case the cleanout must not be on the sewer side. In New York City and other cities the trap must be placed "near the front of the house" either inside or outside. In the large New Jersey cities the cleanout is to be made tight with cement. New Bedford provides for the co-operation of plumber and drain layer:

"When the city drain pipe layer is ready to connect the vitrified pipe with the iron pipe the plumber shall have the iron pipe caulked into the running trap; he shall place the trap in position for the drain layer to make the cement connection. All cast-iron soil pipe shall be laid by the plumber."

In Manchester, N. H., and Hartford, a main trap in the drain is not required, and in Albany it may be omitted with the approval of the board of health. In Manchester if the trap is omitted the fresh air inlet is also to be omitted.

Back Pressure Valve.

"All permits for connecting with public sewers are given on condition that owners take all risk of damages that may result from water setting back into premises from the main sewer, and in order to prevent as much as possible the setting back of water the owner is hereby required at his own cost and risk to put in a self-acting or other valve in all cases when a back flow from a sewer is is to be apprehended and it shall be the duty of the owner to keep the valve in order, and he shall be responsible for its action in all cases. When the sewer connection is of iron and carried up within the premises as a closed pipe, without openings or connections of any kind, above the level of any possible back-flow, the flood-valve may be dispensed with." [4]

In Lawrence area drains must be suppled with back pressure valves. See also sub-soil drains.

[1] Detroit, Rule 18.

[2] San Francisco, Sec. 38.

[3] District of Columbia, Secs. 114–5.

[4] District of Columbia, Sec. 86.

Traps for Fixtures.

"Every water-closet, urinal, sink, basin or bath, or set of wash trays, must be separately and effectively trapped. The traps must be placed as near to the fixtures as possible, and in no case more than two feet from the fixtures. In no case shall the trap of one fixture connect with the trap of another." [1]

In other cities the words "other fixtures" are added after traps and sometimes urinal and hydrant wastes are named and usually the trap must be set as "near as practicable." In Lawrence the trap must be a four-inch bottle trap or other trap approved by the board of health.

Many cities do not go so far as San Francisco in forbidding that any two fixtures shall have a common trap, though it is often ordered that:

"In no case shall the waste from a bath tub, basin, sink, or other fixture be connected with a water-closet trap." [2]

In Portland, Me., and New Bedford no bath waste shall be connected with a set tub or sink-waste; but in Worcester and Somerville, Mass., fixtures may have a common trap if they are not distant from it more than three feet, and in Somerville the trap must have a diameter of three and one-half inches.

"Traps and branch waste pipes shall be of the following sizes:

For basins and pantry sinks	1½ inches.
Slop sinks	3 "
Kitchen sinks	1½ or 2 "
Bath tubs	1½ or 2 "
Urinals	1½ or 2 "
Laundry tubs	1½ or 2 "
Water-closets	4 " [3]

In the District of Columbia "No trap with a hand-hole cover shall be used."

Traps at the foot of vertical soil pipes are forbidden in many cities.

Area and Surface Drains.

"No opening shall be provided in the sewer pipe of any building for the purpose of surface drainage unless said opening is properly trapped and supplied with water from a suitable fixture. When said surface drain is situated at a distance greater than twenty feet, reckoning in a horizontal line from said suitable fixture, then it may be supplied by a hose-bibb. Bell traps strictly prohibited." [4]

In Pittsburgh this connection must not be used as a fresh air inlet. Masons' traps in such positions are prohibited in New York City, and in Chicago no catch basin will be allowed in any building:

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[1] San Francisco, Sec. 23.

[2] Brooklyn, Sec. 34.

[3] Brooklyn, Sec. 36.

[4] San Francisco, Sec. 25.

"All pipes that must be left open to drain cellars, areas, yards or gardens, shall be connected with suitable catch-basins, the bottoms of which shall not be less than two and one-half feet below the bottom of the outlet pipe, the size, form and construction of which are to be prescribed by the officer named in section three. . . . When the end of the drain pipe is connected with a temporary wooden catch-basin for draining foundations during the erection of buildings, the drain-layer shall be held responsible for dirt, sand or any other substance getting into the drain or sewer from such temporary catch-basins." [1]

"Every cellar shall have a trap for surface drainage provided with a brass clean-out plug caulked into the inlet of same, and must be located where it will be accessible at all times.

"Surface drains must never be connected directly with the trap, but shall enter an open well that shall be built around the trap." [2]

"The superficial area of every catch-basin hereafter constructed shall not be greater than four hundred and fifty-six square inches, and except in cases where the catch-basin is to be placed in the street, the same shall be covered with a flagging stone with movable iron cover; in cases where the catch-basin is to be placed in the street or adjoining the wall of any building it shall be of iron of such construction as may be approved by this Board." [3]

Grease Trap.

"Waste pipes from kitchen sinks in any hotel, restaurant or other public cooking establishment, and in every dwelling house, shall run separate to a grease trap in yard when practicable; and when the same is not practicable to put in yard, a grease trap must be placed below each sink, with water jacket to keep the water in grease trap chilled.

"Grease traps in yards shall be constructed of hydraulic cement, sand and gravel in the proportions of one part cement to three parts of all other material, or of earthen ware or brick, laid in hydraulic cement, and in case of brick being used, the wall shall be plastered on all sides and bottom with hydraulic cement mortar at least one inch thick, made in proportion of one of cement to two of sand, with eight-inch wall. Grease traps to have stone or iron covers, the same to be not more than six inches below grade. Grease traps for small building or ordinary dwelling houses to be not less than twenty-four inches in diameter. Hotels, restaurants or other cooking establishments to have the size of grease traps not less than forty inches in diameter, and according to the directions of the plumbing Inspector." [4]

Fresh Air Inlet.

"Every sewer shall have a fresh air inlet of not less than four inches internal diameter entering the sewer between the intercepting trap and all house connections, and extending to the external air at least one foot above the surface of the ground at a place shown on the approved plan. When it is not practicable to extend the fresh air inlet above the ground, it shall be carried to the curb and terminate in a suitable receptacle, covered by an iron grating." [5]

In Pittsburgh the inlet must have an accessible cleanout and

"Where air inlets are located off the stairway, on grass plats, lawns, etc., they shall extend not less than six inches, nor more than fifteen inches above the surface

[1] Providence, Sec. 13.

[2] Hartford, Sec. 9.

[3] Asbury Park, Sec. 9.

[4] Denver, Secs. 11 and 5.

[5] Brooklyn, Sec. 21.

of the ground, and be protected by a cowl securely fastened with bolts. Where the fresh air inlet is placed at the curb, there shall be at least three feet of extra heavy cast-iron pipe extended up even with pavement, and covered with strong iron grating."

In Rochester the inlet must extend twelve inches above the ground and be provided with a suitable cap. In the District of Columbia it must have a one-quarter bend and grating.

In Milwaukee the inlet must enter drain just six feet inside the trap.

In the District of Columbia the inlet must be six inches in diameter, in Portland, Me., three inches, and in Milwaukee two inches.

In New York City the inlet must be not less than fifteen feet from the nearest window, and no cold air box from a furnace shall be so placed that it can possibly draw air from it. In Hartford, Lowell, and San Francisco it must not be within ten feet of a window. In Milwaukee it must be four feet from a window; in Detroit and New Bedford five feet or such distance as the inspector may direct, and in Port land eight feet from window or cold air box of furnace.

In Philadelphia there must be a second inlet "at the rear of the system of plumbing when the vertical line of soil pipe is located in the central part of the building and is deemed insufficient to ventilate the entire system."

Back Air Pipes Required.

Nearly all plumbing rules require that "traps must be protected from siphonage by special air pipes." Such pipes are not, however, invariably required:

" . . . Water-sealing traps of any pattern may be used when separate air pipe connections from the top of the same are provided: where separate air-pipe connections are not provided, traps which will not unseal shall be used; such traps to be first approved by the inspector of plumbing." [1]

Similar provisions are found in Atlanta and Albany, and in Rochester back airing may be omitted by special permit of the board of health. In Detroit, where any fixtures are not more than five feet from a vertical run of soil pipe, and no fixture over the same, the back vent may be omitted. In Portsmouth the maximum distance is four feet measured from the centre of the trap to the hub of the Y on the main pipe:

" Where a sink, bath tub, wash bowl, wash tub, urinal, or any other plumbing fixture is located on a floor not more than six feet from the ground (within building), and no fixture or fixtures connected or to be connected to waste pipe, the two-inch waste pipe with increaser shall be run to and through the roof; re-vents may

[1] Providence, Sec. 17.

be dispensed with, *provided*, the trap of the fixture is not more than five feet from the waste pipe." [1]

In Fall River all traps liable to be siphoned or affected by back pressure shall be protected therefrom by a special air-pipe. In the District of Columbia and San Francisco traps shall be vented "excepting that in the case of the upper, and only water-closet on a soil pipe and having its centre within two feet of the centre of the stack, it will not be required." In Cincinnati a single fixture discharging into an open drain needs no vent pipe. In Buffalo "the use of non-siphoning automatic fixtures of old buildings only allowed at the discretion of the health officer." In New Haven Sanitas traps are allowed without vents. In New Jersey cities traps must be vented by an air pipe,

"Or by some approved automatic vent. Approved mechanical traps may be substituted where it is necessary or advisable, but only on special permit from the Board of Health."

The McLellan vent is often used in Newark, as many as 426 having been put in in 1896. It has been permitted in Albany, but has not been satisfactory, as the mercury is driven out when obstructions are forced.[2]

"Ventilating pipes must be run with as few bends as possible, and the branches must be connected to main vent at an angle of not less than forty-five degrees, and be increased in size every thirty feet. When combined the vent pipes must be increased in size according to the following table:

"In all buildings of four stories or less—

"Branch vents of water-closets shall not be of a size less than the following:

"(The term 'Branch Vent' as here applied shall be construed to mean all that vent pipe located between the fixture and the point where the vent joins into the main vertical vent.)

"Four water closets may be vented into a 2½-inch branch vent.

"Five to eight water-closets may be vented into a 3-inch branch vent.

"Nine or more water-closets may be vented into a 4-inch branch vent.

"Single water-closets located in the basement or first floor of a building, if the soil pipe drop does not exceed 10 feet, may be vented with a 2-inch vent pipe for a distance of 30 feet; when the vent is longer than 30 feet, then the entire vent shall be 2½-inch until the distance of 60 feet, when it shall be increased to 3-inch to a finish. In all cases where the soil pipe has a drop greater than 10 feet, then the soil pipe shall be continued full bore to a point 2 feet above roof, and act as a vent pipe.

"In each and every building to be used as a residence or otherwise, and where a water-closet or closets is, or are, situated either within the premises, or within ten feet of the outside walls of said premises, then, in any and all cases, it shall be required that at least one four-inch vent pipe be continued to above the roof line, and this, irrespective of what distance the soil pipe may drop.

"Three wash basins, baths or similar fixtures may be vented by a 2-inch vertical vent pipe.

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[1] Chicago, Sec. 37.

[2] Albany, Report of Board of Health (1898), p. 10.

"Six similar fixtures by a 2-inch vertical vent pipe.

"Twelve similar fixtures by a 3-inch vertical vent pipe.

"When more than 12 fixtures, they may be vented by a 4-inch vertical vent pipe. Single one and one-half inch trap may be vented by a one and one-half inch vent pipe when the vent does not exceed twenty-five feet. When it is in excess of twenty-five feet, then the entire main vent shall be of two-inch pipe.

"When one and one-half inch branch vents are used or fixtures the said branch vent shall not exceed five feet. In the calculation of the relation of basins, baths, and similar fixtures towards water-closets, it shall be reckoned that four basins or baths or similar fixtures shall equal two water-closets, and so on, at that ratio.

"When more than sixteen wash basins, baths or similar fixtures are on a line and are situated in a five-story building or over, below the fifth floor, then the vertical vent from the fifth floor up must not be less than four-inch pipe.

"On buildings five stories or over not more than twenty feet may be used as a branch vent."[1]

In Denver not more than thirty feet of one and one-quarter inch pipe can be used for a vent for one fixture, thirty feet of one and one-half for two fixtures, and thirty feet of two inch-pipe for water-closets. In Somerville vent pipes of less than thirty feet must be two inches, and over thirty feet three inches in diameter. In Hartford vents for three water-closets must be two-inch, for more than three water-closets three-inch, and vents for four fixtures other than water-closets must be one and one-half-inch, and for more than four fixtures two-inch. In Cleveland one fixture may have a one and one-quarter-inch vent, and two fixtures one and one-half. In buildings of over four stories water closet vents must be three inches and fixture vents two inches in diameter. In the District of Columbia in three story buildings with three water-closets or three fixtures there must be a vertical vent to which all vents lead, increasing in diameter to equal the combined diameter of the vents entering it.

Most cities, like San Francisco, require that vent pipes shall extend above the roof in the same manner as soil pipes and usually they must never be less than four inches in diameter; or they may combine and enter the soil pipe above the highest fixture; the distance above the fixture is specified as three and one-half feet in San Francisco and Cleveland, five feet in Detroit, and six inches in Bridgeport; but Denver requires that in buildings of more than two stories the vent pipes must run separately through the roof. In Hartford if fixtures are eight feet from a line of vent they must have a separate vent to the roof.

It is usually provided that vent pipes must have a continuous slope to prevent filling with condensation.

New Bedford requires siphon closets to be vented from the lead bend.

The use of lead pipe for vents is usually restricted to short lengths.

[1] San Francisco, Sec. 28.

In Cleveland it must not be lighter than extra light. In Boston, Somerville, and Manchester, N. H., lead can be used only when exposed to view. In New Haven lead is not permitted.

Safe Wastes.

"Every safe waste under a basin, bath, water-closet, tank or other fixture, must be drained with a special pipe of lead, galvanized or dipped iron pipe, of a diameter not less than one inch bore, and in no case directly connected with any soil, waste, vent, drain or sewer, but made to discharge outside of house. Urinal safe waste may be connected with main waste or soil pipe; provided, suitable traps are provided to both urinal and safe wastes, and both properly vented and both supplied with water." [1]

"Wherever safes are placed under fixtures the safe wastes shall be run separately to the basement or cellar, and be closed by a hinged brass flap valve, or other approved device, to prevent cellar air from rising through the pipe. In tenement houses the safe wastes shall be extended to the roof. Urinal platforms shall not be provided with safe wastes." [2]

In the City of New York water-closets, and in the District of Columbia any fixtures cased with wood must have a safe drained as above. In Cleveland wastes from stop cocks must not run into soil or waste pipes.

Refrigerator Wastes.

"No waste pipe from a refrigerator or other receptacle where food is kept shall be connected with a drain, soil or other waste pipe. Refrigerator wastes must be of a diameter of not less than one and one-half inches, and so arranged as to be properly flushed. They shall empty over a water supplied sink, the mouth of the pipe to have a brass-hinged flap valve. In tenement houses, vertical lines of refrigerator wastes shall have a diameter of at least two inches, and shall extend through the roof for ventilation." [3]

In New York refrigerator wastes must not discharge on to the ground.

"No waste pipe from any refrigerator, or other receptacle in which provisions are stored shall discharge into the soil of any cellar bottom, or into the soil beneath any floor of any building; or into any waste, drain or soil pipe." [4]

In Rochester refrigerator wastes must be as short as possible.

Overflow Pipes.

"Overflow pipes from fixtures must, in each case, be connected on the inlet side of the trap.

"The overflow pipes from water-closet cisterns may discharge into the water-closet bowl, an open sink, or where its discharge will attract attention and indicate that waste of water is occurring, but not into the soil or waste pipe, nor into the drain or sewer." [5]

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[1] San Francisco, Sec. 36.

[2] Brooklyn, Sec. 38.

[3] Brooklyn, Sec. 39.

[4] Providence, Sec. 20.

[5] City of New York, Secs 43 and 50.

In Rochester they may run into a roof gutter.

Water-closets to be Provided.

"All buildings that are located upon a street in which a public sewer exists must be provided with water-closets either in the house or yard. When there is no sewer in the street, and no practicable way of reaching a sewer in an adjacent street, water-closets may be connected with a water-tight cesspool, or privy vaults will be permitted." [1]

In New York there must be one water-closet for every fifteen persons, in Rochester one for every ten; in Somerville, Mass., one for each family; in Albany one for two families; and in Fitchburg and Worcester one for each family and every fifteen persons.

Certain Water-closets Prohibited.

"Privy sinks, pan closets and all water-closets having any mechanism in connection with the bowl, forming a mechanical seal, are prohibited." [2]

"Hopper closets shall not be allowed inside any building or enclosed porch. They may, however, be used in yards or upon open porches. Provided, they are supplied with a tank." [3]

New Bedford forbids the use of long hoppers and Hartford forbids iron hoppers and offset washout closets. The District of Columbia requires every water-closet to have a rim. Asbury Park forbids long hoppers except where there is exposure to frost. All iron traps must be porcelain lined.

Water-closet Floor Flanges.

"Earthern or iron water-closets, having traps above the floor, using lead connections, must have a cast brass flange, not less than one-eighth inch thick, soldered to the lead and bolted to trap of closet, the joint being made perfectly air-tight." [4]

"Floor plates shall be used with earthenware water-closet traps, and the joints shall be secure and gas tight. Brass bolts and a brass flange not less than one-quarter of an inch in thickness, soldered to lead bend and fitted with a rubber gasket or white lead putty to insure a tight joint, shall be used." [5]

In Cleveland and Philadelphia the flange may be three-sixteenths of an inch thick. In Buffalo pasteboard gaskets may be used. In Asbury Park the use of rubber washers for floor connections is prohibited.

Seat Ventilation for Water-closet.

"No water-closet shall be set in any room or apartment that has not a window having an area of at least three square feet opening directly to the external air, unless there is a local vent, with its opening under or near the seat of the closet,

[1] Brooklyn, Sec. 45.

[2] Brooklyn, Sec. 46.

[3] San Francisco, Sec. 41.

[4] Brooklyn, Sec. 48.

[5] New Bedford, Sec. 20.

and carried to and entering a chimney flue above all openings for stoves or ventilating registers or continued up through the roof, with heat or other means provided to ensure a steady current of air.

"Such pipes shall be of copper or galvanized iron, and connections with crockery shall be made with a brass, lead or copper sleeve, with the joint white-leaded; they shall not be less than two inches in diameter for distances of less than thirty feet, and for any further distance their diameter shall be increased to three inches.

"When more than one closet connects with such pipe, its capacity shall be at least equal to that of all pipes that enter it." [1]

In Fitchburg the diameter of local vent for one closet shall be two inches, for two to four closets three inches, and for any number exceeding four closets a proportionally increased diameter. If there is no heated flue the vent shall enter the kitchen chimney above the highest opening. The connection with the chimney shall be made with cast-iron or other suitable material of a size not less than one size larger than the vent. In Lawrence the connection with the closet is to be made tight with paint and plastic putty or other composition acceptable to the board of health.

Location and Ventilation of Water-closet.

"Water-closets must never be placed in an unventilated room or compartment. In every case the compartment must be open to the outer air, or be ventilated by means of an air-shaft not used to ventilate any living or sleeping room, and having an area of at least four square feet, and an opening at the roof to the external air of an area equal to the area of the shaft. In no buildings will water-closets be allowed in cellars, except by special permit from the Department of Health." [2]

In New York City, Fall River, Rochester, Lawrence, and Worcester the area of the ventilating shaft may be three square feet.

"No water-closet shall be set up in any room or apartment that has not a window having an area of at least three square feet opening directly to the external air; they will, however, be permitted in rooms or apartments having no windows communicating directly with the external air, providing that there is a duct to the open air through a heated flue with an opening under, or near the seat of the water-closet for taking air; and such air ducts shall enter the flue above all openings for stoves." [3]

It is absolutely forbidden to place water-closets in cellars in New York City, Buffalo, Pittsburgh, and Hartford.

"This rule does not apply to old property where no other place can be provided; in which case the walls of closet rooms must be lathed and plastered or sheathed with plain matched boards, and floors of rooms and passageway shall be either concrete, cement, or boarded. Entrance to be sufficiently lighted and free from any means of probable foul deposits." [4]

In Bridgeport wooden floors shall not be placed under any water closet below the first or main floor; all such plumbing as shall be placed

[1] Haverhill, Sec. 7.

[2] Brooklyn, Sec. 50.

[3] Fall River, Sec. 11.

[4] Lawrence, Sec. 7, Rule 3.

in cellars or basements shall rest on solid masonry. In Cleveland water-closets must not be located in the sleeping apartment of any building.

"Each room or stall in which a closet is set will be well lighted. No direct supply closet shall be set unless located outside the building proper in places where tanks cannot be made secure from frost, and no such location of closets shall be allowed unless the board has become satisfied that it is impracticable to put closets in the building proper. When direct supply closets are allowed they shall receive their water supply directly from the main through fixtures, service pipe, and connections approved by the board of health." [1]

"Water-closets, when placed in the yard, shall be so arranged as to be conveniently and adequately flushed, and their water supply pipes and traps shall be protected from freezing by placing them in a hopper-pit, at least three and one-half (3½) feet below the surface of the ground, the walls of which shall be of brick or stone laid in cement mortar. The waste water from the hopper stop-cock shall be conveyed to the drain through a three-eighths (⅜) inch pipe, properly connected.

"The enclosure of the yard water-closet shall be ventilated by slatted openings, and there shall be a trap door in the floor of sufficient size for access to the hopper-pit." [2]

"All vaults condemned as nuisances must have hopper closets substituted, properly trapped and connected to sewer with proper ventilation, and shall not be built over main house sewer, but should be placed on a branch, suitably trapped and supplied with water for flushing and connected with main sewer from house." [3]

Water-closet Supply.

"Every water-closet within or adjoining the house must be supplied with water from a separate tank or cistern containing at least ten gallons below the overflow, and shall have a flushing pipe not less than one and one-quarter inches in diameter. Cistern valves shall be so fitted and adjusted as to prevent waste of water. When the tank or cistern is located outside the water-closet compartment, the stand pipe shall be covered by a float valve to prevent circulation of air from the water-closet to the adjoining room." [4]

Many cities permit a group of closets on one floor to be flushed from one tank, but this is not permitted in tenement houses in New York City. In Worcester water-closet tanks can be used for no other purpose except with the permission of the board of health. But usually there is no exception to the rule that they shall not be so used.

In the District of Columbia and Rochester, when the pressure is not sufficient to supply these tanks, adequate pumps must be provided. In New York:

"Where the pressure of Croton water is insufficient to supply water-closets or other fixtures in tenement and lodging houses, factories or workshops, water must be supplied for such fixtures from a house tank of such size as to afford an adequate supply at all times." [5]

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[1] Portsmouth, Sec. 11.

[2] Philadelphia, Rules 41-2.

[3] Detroit, Rule 33.

[4] Brooklyn, Sec. 47.

[5] City of New York, Sec. 51.

The size of the discharge pipe must be one inch in Boston, and one and one-eighth inch in Cincinnati. In Philadelphia the tank must hold eight gallons when full up to the level of the overflow pipe, except that automatic or siphon closets shall hold five gallons. The same rule is found in Reading, but in Cleveland and Scranton the automatic tanks must hold six gallons. Tanks supplied under street pressure must have a one-inch overflow in Somerville, and in Albany the overflow may enter inside the inlet of the trap.

Many cities allow outside closets to be flushed direct:

"Water-closets which are located away from the building may be arranged so as to receive their water supply directly from the main, but they must be so arranged as to be conveniently and adequately flushed and efficiently protected from freezing." [1]

A new device for flushing closets, called the "flushometer," has been introduced and is permitted by a recent Philadelphia rule.

Strainers.

"All waste pipes, from fixtures other than water-closets, must be provided at the outlet of such fixtures with strong metallic strainers, to exclude from such waste pipes all substances likely to obstruct them." [2]

Wooden Tubs and Sinks Prohibited.

In Brooklyn "wooden laundry tubs are prohibited; all such fixtures shall consist of non-absorbent materials." A similar rule is found in the District of Columbia, Chicago, Lawrence, Lowell, Pittsburgh, and other cities. In Worcester wooden tubs and sinks are prohibited, unless rendered impervious to water. In Asbury Park cement as well as wood is forbidden, but wooden sinks may, with the approval of the board of health, be allowed for washing dishes.

Bath-Tubs Required.

In Baltimore a recent ordinance requires a bath tub in every new house.

Hot Water Boilers.

"All hot water boilers set hereafter shall be provided with a steam exhaust or expansion pipe leading up to and above the tank which supplies the water to the boiler. This tank shall be located so as to prevent danger from freezing. When pressure boilers are used they shall be provided with vacuum valves or some other suitable appliance to prevent the collapse or bursting of the boiler." [3]

In Pittsburgh "the sediment pipe of kitchen boilers must not be connected on the outlet side of the sink trap."

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[1] Bridgeport, Sec. 51.

[2] Albany, Sec. 37.

[3] Fitchburg, Sec. 31.

Sub-soil Drains.

"Sub-soil drainage pipes shall be provided with back water valves and connected with drains from rain leaders, or else provided with trap and valve and connected with the main drain outside of house trap." [1]

Back pressure valves are also required on subsoil drains in other cities.

No Steam to be Allowed to Enter Sewers.

"No steam exhaust, blow-off, or drip pipe shall connect directly with the sewer, house drain, soil, waste or vent pipe, or with any rain-water conductor. Steam shall be discharged into a blow-off or condensing tank, the waste or overflow of which shall be connected with the house sewer outside of the house trap. Joints of the blow-off pipe shall be screw joints, or in case of cast-iron pipe they shall be rust joints." [2]

The condenser must be for low pressure of not less than twenty gallons and for high pressure of not less than forty gallons, with a vent leading from the dome of a diameter not less than that of the discharge pipe. In Providence the size of the condenser is to be determined by the inspector.

"No steam exhaust, hot water, or hot blow-off pipes from any steam boiler, acids, chemicals, refuse, manufacturers' waste, noxious gas, or vapors shall be connected with or be discharged into any soil or waste pipe or its connection with the main or street sewer. All steam or hot water pipes from any steam boiler or heating apparatus if to be discharged into a sewer through the house drain, must be trapped and be connected on the sewer side of the running trap.

"The waste from the condenser to sewer side of running trap shall be galvanized pipe with screw joints.[3]

Public Urinals.

In Denver all public urinals must be supplied with a flush tank, the flush to be connected with urinal and head of trap.

Water Service.

Rules governing the construction of water supply pipes are usually prepared and enforced by the water commissioners or water company. As defects in this department of plumbing produce uneconomic rather than unsanitary consequences their prevention may safely be left to the officers most interested in preventing waste. Nevertheless there is a manifest convenience in having all the plumbing inspected and controlled by one inspector. Hence a number of cities do regulate this work partially if not entirely by their plumbing codes:

"Tanks for drinking water are objectionable, but if indispensable, they must never be lined with lead, galvanized iron or zinc. They should be constructed of iron, or of wood lined with tinned and planished copper, or of wood alone." [4]

[1] Detroit, Rule 19.

[2] Brooklyn, Sec. 54.

[3] Cleveland, Sec. 21.

[4] City of New York, Sec. 52.

"All supply pipes situated in exposed places shall be protected from the frost, and wherever practicable water pipes shall be kept away from any exterior wall. Horizontal lines of lead supply-pipe shall be properly supported throughout their entire length, and so arranged as to be easily and quickly drained. Vertical lines of supply-pipe shall be supported by tacks soldered to the pipe and placed not more than two feet apart. All joints in lead supply-pipes shall be wiped joints.

"Lead supply-pipes under pressure from the street mains shall be of standard lead pipe known as 'A A,' having not less than the following weights:

⅜	inch	pipe,	1½	lbs.	per	foot.
½	"	"	2	"	"	"
⅝	"	"	2¾	"	"	"
¾	"	"	3½	"	"	"
1	"	"	4½	"	"	"
1¼	"	"	5¾	"	"	"
1½	"	"	7	"	"	"[1]

As an example of the more extended regulations governing this class of work, such as are adopted by water boards, reference may be had to the plumbing regulations of the District of Columbia, Secs. 34–66.

Application of Rules to Old Plumbing.

Unless otherwise specified, plumbing rules do not apply to work constructed before their adoption; but sometimes under the authority of statute law the board of health or other body which adopts these rules makes them applicable in a greater or less degree to old plumbing as well as new. Usually the new rules are to be applied when changes are made. In some cities the rules are to apply only when old plumbing has been condemned by the board of health:

"When the drainage of buildings erected prior to 1886 has been inspected and condemned, plans must be filed, and the new work of alterations shall be executed in accordance with these rules and regulations."[2]

In Philadelphia a very large amount of old plumbing has been renewed, and it is said to be difficult to let a house without good modern plumbing. The extent of these renovations is well shown by the fact that in 1896 there were filed in Philadelphia 6,648 plumbing plans for new buildings and 9,078 for old buildings.

"When a building has been inspected and the plumbing work condemned by the building inspector as being in an unsanitary condition, notice shall be given in writing to that effect, informing the agent or owner of the said building what character of repairs or improvements are to be made, and if there are any objections to the repairs or improvements ordered, they must be filed in the health office, within a period of three (3) days, and if objections are not so filed the alterations or improvements must be made as directed.

"If objections are so made, the agent or owner shall be heard by the health officer, and his decision shall be final and conclusive as to the repairs or alterations to be made; provided, if any questions are involved, which require consideration

[1] Brooklyn, Secs. 40–1.

[2] Philadelphia, Rule 7.

and action of the board of health in the judgment of the health officer, the same shall be submitted to the board of health for determination." [1]

"It shall be his (inspector of plumbing) duty at any time during reasonable hours, under like direction, on application of the owner or occupant, or the complaint under oath of any reputable citizen, to inspect or cause to be inspected any house in said district, and to examine the plumbing, drainage, and ventilation of sewers thereof.

"And he shall, after inspection and upon approval by his immediate superior, serve a notice on the owner, or agent, of the premises, directing such changes as are necessary to make the plumbing conform to the plumbing regulations, to be commenced within ten days from the date of the service of the notice and completed within a reasonable time thereafter." [2]

But it is provided in addition that there may be an appeal by the owner (who shall deposit twenty dollars) to the engineer commissioner who shall order a re-examination by three inspectors. If this report confirms the first the changes must be begun in five days, and failure is to be followed by prosecution.

Administration of Plumbing Codes.

As has been said, the execution of plumbing laws is usually in the hands of the board of health. This is true of nearly one hundred cities and towns of which inquiry was made. The following is a list of cities in which the plumbing is otherwise controlled:

New York	Department of Buildings.
Boston	Building Department.
Milwaukee	City Engineer's Department.
Cambridge	Supt. of Buildings.
Cincinnati	Inspector of Buildings.
St. Louis	Board of Public Improvement.
Somerville, Mass	Inspector of Buildings.
Butte, Mont	Inspector of Buildings.
Newton, Mass	Inspector of Buildings.
New London, Conn	Board of Sewer Commissioners.
Erie, Penn	Water Department.
Providence	Independent Department.
Omaha	Independent Department.
Pawtucket	Independent Department.
Memphis	Independent Department.
Columbus	Department of Public Improvements.
Minneapolis	Building Department.

Licensing of Plumbers.

It has of late come to be generally considered that the first step in securing good plumbing is to secure good plumbers. To bring this about examining boards are established to examine and license plumbers.

[1] San Francisco, Sec. 47.

[2] District of Columbia, Sec. 3.

Most of the examinations are made under state law. Such laws are found in the District of Columbia,[1] Illinois,[2] Maryland for Baltimore,[3] Massachusetts,[4] Minnesota,[5] New Hampshire,[6] New York,[7] Ohio,[8] Pennsylvania, for cities of the second class,[9] Texas,[10] Washington,[11] and Wisconsin,[12] and in all of them provision is made for the examination of the plumbers by a properly constituted board.

Of the above states, in Maryland and Minnesota the examining board is a state board and is appointed by the Governor. In both states the term of service is two years. In Maryland the board consists of three practical plumbers, the commissioner of health of Baltimore and a member of the state board of health. In Minnesota the board consists of two master plumbers, two journeymen and one plumbing inspector of any city of the first class.

In the other states the law provides for a local examining board as follows:

Massachusetts. In cities of 5,000 inhabitants, or those with a water and sewerage system there must be an examining board to consist of the chairman of the board of health, the inspector of buildings, and a plumber appointed by the board of health. If there is no inspector of buildings there must be two plumbers.

New York. In all cities except the City of New York and Albany the examining board appointed by the mayor is to consist of two master plumbers, one journeyman, each of ten years' experience, the chief engineer of sewers, and the chief inspector of plumbing.

Illinois. In cities and villages of over 10,000 inhabitants, the board consists of the chairman of the board of health, one master plumber and one journeyman.

Washington. In cities of the first class the examining board consists of the president of the board of health, the inspector of plumbing, one master plumber and two journeymen. If there is no inspector another master plumber is added.

[1] District of Columbia, Act of 23 April, 1892.

[2] Illinois, Act of 10 June, 1897.

[3] Maryland, Chapter 439 of 1896.

[4] Massachusetts, Chapter 477 of 1893, 455 of 1894, and 453 of 1895.

[5] Minnesota, Chapter 319 of 1897.

[6] New Hampshire, Chapter 55 of 1899.

[7] New York, Revised Statutes (1895), p. 437.

[8] Ohio, Annotated Statutes (1900), Sec. 4238(-10).

[9] Pennsylvania, Chapter 186 of 1895.

[10] Texas, Chapter 163 of 1897.

[11] Washington, Code (1899), Secs. 1248-54.

[12] Wisconsin, Statutes (1898), Sec. 959 (-53), (-59).

New Hampshire. In cities and towns which accept the act, the mayor in cities, and the selectmen in towns appoint the board.

Texas. In cities with sewers or cesspools the board consists of a member of the board of health, the city engineer, the plumbing inspector, one master plumber, and one journeyman, each of five years' experience.

Ohio. The Ohio law is like that of Massachusetts, except that two master plumbers and one journeyman are on the board. Physicians may be appointed in the place of plumbers if the latter are not available.

Wisconsin. In cities of the first, second, and third class, the board consists of the commissioner of public works, or the chairman of the board of health, the inspector of plumbing, and a plumber appointed by the mayor. If there is no inspector of plumbing, there shall be two plumbers appointed by the mayor.

In all of these boards the members are to serve without pay, except in Massachusetts, where the plumber is to receive five dollars per day for actual service.

These laws are all mandatory and require the establishment of the licensing board and forbid any one acting as master or journeyman plumber without a certificate, which shall be given only when the candidate has passed a practical and satisfactory examination. Usually it is sufficient for one member of a firm to have a license. In Massachusetts the board examines, but the board of health or inspector of buildings issues the license. The New York law differs from the other laws in requiring an examination of master plumbers only; but all licensed plumbers may register with the board of health in New York.

Outside of the states which have by statute provided for the examination of plumbers several cities have adopted this plan, sometimes with and sometimes without special legislative sanction. Among these are Atlanta, Chicago, Detroit, Hartford, New Haven, Pennsylvania cities of the second class, Portland, Me., San Francisco, St. Louis, and Savannah. In Atlanta the examining board consists of a master and journeyman plumber, chief sanitary inspector, the city engineer, and secretary of board of health. In Portland, Hartford, and San Francisco, it is the board of health; in Detroit it is a special board appointed by the board of health.

In Chicago the commissioner of health appoints a competent plumber to be examiner. In that city only masters are examined; in Hartford only journeymen, but in other cities both classes. In the District of Columbia masters and journeymen are to be examined by a board appointed by the commissioners of the district. In Denver, while

there is no examination, the license has to be approved by a board consisting of a member of the master plumbers' association, a member of the journeymen plumbers' union and the plumbing inspector; the association members are to be elected by their respective associations. In St. Louis plumbers are examined by the supervisor of plumbing (chief inspector).

The rules governing the examinations in Detroit are given below.[1]

Somewhat more elaborate rules are found in the District of Columbia (sections A to J).

The states and cities which provide for the examination of plumbers usually provide also for the issuing of a license or certificate, and the registration of the name and address of the plumber with the board of health or other department having charge of the plumbing.

As the licensing of plumbers is of value to the plumber as well as to

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[1] Detroit Rules for Plumbing and Drainage:

"RULE 6. Application for examination of master plumbers will be received by the clerk of the board and acted upon at the next regular meeting, and shall be properly filled out and acknowledged and filed with the clerk before being received by the Board of Examiners. The applicant shall state on oath, and in his own handwriting, that he is a citizen of the United States; that he is a party directly interested in the license, giving his full name, residence, street and number, his term of residence in the city, and the names of the parties, firms or corporations in whose service he has been. He shall also state his business or employment during the five years immediately preceding the date of application, as well as the number of years during which he has been engaged in the business, trade or calling of plumbing. The application must be accompanied by a certificate signed by not less than two reputable citizens of Detroit, stating that they are personally acquainted with the applicant and believe him to be of good moral character and temperate habits. The examination will be of such character as to test the fitness and qualifications of the applicant for the trade, business or calling of plumbing, who must have a standing of at least sixty per cent. in his examination to be entitled to a certificate of competency. Falsehood or fraud in the examination shall be a sufficient cause for a refusal of his certificate, together with the dismissal of his application. When the applicant fails to pass the examination he shall not be entitled to another examination before the next regular meeting of the board.

"RULE 7. There will be two grades of examinations for journeymen plumbers, viz.: Ordinary and honorary. The applicant can select the grade, and if successful he will be furnished with a certificate of competency in either grade as the case may be, but he cannot take the honorary grade until he has passed a successful examination in the ordinary grade. If the candidate fails to pass the examination in either case, he shall not be entitled to another examination before the expiration of one month from date of failure. The applicant who applies for a certificate of competency as either ordinary or honorary journeyman plumber, must give his full name, residence, street number, term of residence in the city, if a citizen; the names of the parties, firms or corporations in whose services he has been; where he served his apprenticeship; how long he has been engaged as a journeyman plumber. If the said journeyman plumber wishes to engage in business for himself at any time, he must comply with section 2 of the rules relating to master plumbers, before engaging therein."

the public it is deemed wise in many cities to charge a fee for the license or for the examination.

The following are some of the fees :

City or State.	Master.	Journeyman.	Annual Renewal.
Massachusetts	$2 00	$ 50	$ 50
New York	5 00		
Ohio	5 00	1 00	
Pennsylvania cities of the second class	5 00	50	
Maryland	3 00	3 00	1 00
Illinois	5 00	1 00	
Minnesota	3 00	3 00	1 00
Wisconsin	2 00	50	50
Washington	5 00	1 00	1 00
Chicago	30 00		30 00
Denver	10 00		10 00
New Haven	1 00	1 00	1 00
Reading	1 00	1 00	1 00
San Francisco	1 00	1 00	1 00
Texas	3 00	2 00	

In a number of cities, as Philadelphia and Providence, no fee is charged.

As has been seen an annual license only is granted in most instances, but in the District of Columbia the license is for five years, and in Philadelphia and other Pennsylvania cities and in New York the duration of license is indeterminate.

The special act for Philadelphia and also the general act for Pennsylvania cities and boroughs and the New Jersey law provide simply for the registration of plumbers, they do not refer to a license; but in certain cities at least, as Philadelphia, Scranton and Reading, "certificates of registration" are issued which are practically licenses, and in Reading a fee is charged for this. This practice of registration is followed in certain other cities, as Pawtucket, Manchester, and Portsmouth, N. H. In Pawtucket the plumber must notify the inspector of any change in his place of business.

In Buffalo a list of licensed plumbers must be published once a year in the paper receiving the city advertising. In Hartford the list must be published in the city year book.

Bonds.

In a number of cities plumbers are required to give bond.[1]

The usual amount of the bond is $1,000. In the District of Colum-

[1] Chicago Plumbing Code, Sec. 2:

". . . Every such person shall, with such application, file with the city clerk a bond, signed by two or more sureties, to be approved by the city clerk, in the sum of three thousand (3,000) dollars, conditioned that the applicant shall indemnify

bia and Baltimore it is $2,000; in Chicago and Denver, $3,000; in Cincinnati and San Francisco, $500.

Inspectors.

The next step after the adoption of plumbing rules and the licensing of plumbers is the appointment of inspectors. This has in many cases been done without special legislation under the grant of general sanitary powers, as in Baltimore, or under a special statute authorizing the "regulation of plumbing and drainage," as in New Jersey. But several states have enacted general laws authorizing the appointment of plumbing inspectors and the same power has been given to individual cities by special acts. Massachusetts, New Hampshire, New York, Ohio, and Pennsylvania for cities of the second class have not only authorized but directed the appointment of plumbing inspectors, also Washington for the cities of the first class with water and sewers, Wisconsin for cities of first to third class, and Texas for cities with sewers.

Several cities have rules for the government of their inspectors. The San Francisco rules are given below.[1]

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and save harmless the City of Chicago from all accidents and damages which may be caused by any negligence, unskilfulness or inadequacy in the execution or protection of any work he may do under and by virtue of his license, if issued, and that he will conform to all lawful requirements and regulations of the city pertaining to the business of plumbing in accordance with the ordinances of the city, and with the rules and regulations of the department of public works, and the department of health. The city clerk shall notify the commissioner of health of the filing of all such applications and bonds."

[1] San Francisco, Plumbing Code:

"SECTION 61. FIRST — The Plumbing Inspector shall be in attendance at the Health Office between the hours of 8 and 9.30 A. M. and 4 to 5 P. M., to receive plans of proposed plumbing and drainage, and to make appointments for the inspection of the work in the course of construction.

"SECOND — He shall number and file all plans and specifications accepted, and record in the Board of Health the names of the owner and architect, and plumber, and location of work.

"THIRD — He shall, upon being notified, examine all plumbing work before the same is covered up and concealed, and, if found to be in accordance with the rules of the Board of Health, upon presentation of an accurate plan and specification of same by the plumber, shall issue a certificate to that effect. If, on examination of said work, he finds any violation of the rules of the Board of Health, he shall report the same to the Health Officer with a note explaining the necessary corrections, and have it altered accordingly. Upon completion of any plumbing work he shall examine the same, and if found to be in accordance with the rules of the Board of Health, and the plans and specifications filed, he shall issue a final certificate.

"FOURTH — He must make a monthly report to the Board of Health of the number of plans and specifications received; the number approved and rejected; also stating the number of first and final examinations made, and where and by whom

The following is a list of cities having inspectors of plumbing and also the salaries of the inspectors :

City.	Number of Inspectors.	Annual Salaries.
Allegheny	1	$1,200
	1	864
Baltimore	1	1,200
Boston	1	2,500
	10	1,400–1,800
Brockton	1[1]	1,200[2]
Cambridge	1	1,000
Chicago	14	1,000
Cincinnati	2	1,100
Columbus	1	900
Dayton	1	1,000
Denver	2	1,200
Fitchburg	1	1,000
Hartford	1	1,200
Haverhill	1	1,000
Holyoke	1	1,000
Lawrence	2	1,200
Lynn	1	per inspection 5
Milwaukee	1	1,500[3]
	3	1,200[3]
Minneapolis	1	1,000
	1	900
Newark	1	1,200
New Bedford	1	1,400
New Haven	1	1,200
Newton	1	1,250
New York, (Manhattan and Bronx)	1	2,500
	38	1,100–1,500
Paterson	1	1,375
Philadelphia	13	1,200
Pittsburgh	1	1,800
	2	1,500
	2	1,200
Providence	1	1,500[2]
	2	1,092
Reading	1	1,000
San Francisco	1	1,500
	3	1,200
	1	900
Somerville	1	1,200
Springfield, Mass	1	1,100
Syracuse	2	1,200

the rules have been violated, and such other matter as may be required by the Board of Health.

"FIFTH — The Assistant Inspector of Plumbing and Drainage will act under the orders of the Inspector of Plumbing and Drainage, and assist him in discharge of his duties."

[1] Also disinfects.

[2] Has horse and buggy in addition.

[3] Furnish own horse and buggy.

Notification of Inspection.

"The department of health must be notified when the work is begun, and when any work is ready for inspection. All work must be left uncovered and convenient for examination until inspected and approved. No notice shall be sent for any inspection until the work is entirely ready for thorough inspection. In case of any violation of this regulation, the approval of said plans may be at once revoked by the commissioner of health, and upon notice of such revocation being given, all work under said plans must cease."[1]

In Milwaukee the notification must be in writing and specify the plan number. In Lowell the notification must be at least eight hours before the work is sufficiently advanced for such inspection. Failure to be ready for inspection at the time set requires some penalty. In San Francisco it is deemed sufficient cause for suspension of license for such time as the board of health may deem proper. In Reading if the work is not ready another notice must be sent and if the work is not then ready one dollar will be charged for receiving a third notice. In Providence:

". . . In case it shall be necessary for said inspector to inspect said work more than once, by reason of the same not being ready for final inspection, after notice has been given the inspector of the completion of said work, then said inspector shall charge and collect from said plumber the sum of fifty cents for each visit of inspection required to be made as aforesaid."[2]

Inspection of Work.

In Pittsburgh the inspector must examine the work within three days after receiving notice that it is ready for inspection; in Portsmouth and Manchester, N. H., within twenty-four hours. In Albany the sewer connection must be inspected in twenty-four hours, and the other work in three days after notice. If it is not inspected in that time the plumber may cover in the work and complete the job.

"All soil, waste and vent pipe must be tested by the plumber in charge with a water test, as directed by the inspector, and in the presence of the inspector. All openings having been closed by the plumber in charge of the work, pipe-joints, fittings, or fixtures thus shown to be defective or wrongly placed must be replaced within three days and again tested if required by the inspector. None of the said pipes shall be covered from sight till they have been shown to stand the test prescribed to the satisfaction of the inspector. After the plumbing work of the building has been tested as directed, no alteration will be permitted except upon written application of the plumber in charge of the work. Permits must be taken out before work will be inspected. Notice must be sent to the said inspector when work is sufficiently advanced for inspection. No inspection will be made on legal holidays."[3]

"The plumber shall test all soil, waste, drain, and vent pipes in the presence of the plumbing inspector, by the water test, or by such other methods as may be

[1] Brooklyn, Sec. 10.

[2] Providence, Sec. 4.

[3] Cleveland, Sec. 20.

[illegible] pressure to be applied as directed by the [illegible] connections must be made with the [illegible] Place traps in their [illegible] pipes to traps, caulk all ferrules in soil and [illegible] and other supports in their position."[1]

"The entire system of plumbing, including lead, connections, and drains within the building, must be tested by filling the whole system with water, and having it remain filled for at least twenty-four hours."[2]

In Rochester stop cocks shall be placed at the foot of vertical soil or waste pipes for the convenience of the plumbing inspector of the board of health. Other cities than New Bedford permit or require other tests than the water test. Thus in Providence the test is the water test "or if that is not practicable, the air-pressure, peppermint, or other reliable test." In Pittsburgh the peppermint test is permitted, and in Scranton the smoke or peppermint test, and in many New Jersey cities the peppermint, ether, or smoke test. In Asbury Park, Montclair, and Newark the smoke test is usually employed. In New Haven and Asbury Park a five pound air pressure, and in the District of Columbia a two-pound air pressure test is allowed. In Manchester the smoke test may be used if no water is to be had.

After this preliminary test a certificate is usually given approving the work already done. After the work is entirely completed a final inspection is usually required for which another application must be made.

The peppermint or other practical test is allowed for the final test in several cities. In Providence the final test is simply an inspection and no mechanical test is employed other than the first water test.

After the completion of the final test a certificate is in many cities given to the plumber to show that the work has been properly done. The form used in Denver is shown in Appendix 41, a similar form being kept as a stub.

In several cities drain layers are a distinct class from plumbers and have separate licenses. In such cases separate plans, inspections, and approvals are required for the drain layers' work. These usually follow the same form and procedure as provided for plumbers.

In many cities also it is provided that "plumbing work shall not be used unless the same has first been tested and approved in writing" by the inspector:

"Plumbing work shall not be used unless the same has been first tested at the expense of the plumber in the presence of the authorized inspector with the water

[1] New Bedford, Sec. XX, [illegible]

[2] Hartford, Sec. [illegible]

test, or if that is not practicable, with the air pressure, peppermint, or other reliable test, and by him approved in writing." [1]

In Hartford:

"Until such certificate is issued, it shall not be lawful for the owner, manager, or agent of said property to allow the same to be occupied for human habitation." [2]

Penalty for Defective Work.

Violations of plumbing rules, like any other municipal regulations, are punished by fine or imprisonment, but, as is usual in such minor police regulations, the penalties are not severe. Another and more effectual penalty is the revocation of the license of the plumber. In New York this is provided for by statute:

"But such registration may be canceled by such board of health or superintendent of the department of buildings in the city of New York for a violation of the rules and regulations for the plumbing and drainage of such city, duly adopted and in force therein, after a hearing had before said board of health, or superintendent of the department of buildings in the city of New York, as the case may be, and upon a prior notice of not less than ten days, stating the grounds of complaint, and serve upon the person charged with the violation of the aforesaid rules and regulations; but such revocation shall not be operative, unless concurred in by a majority of the local board of examiners." [3]

Another penalty still is to remove defective work:

"The inspector of plumbing shall promptly condemn and order the removal of any defective material, bad workmanship, or of any work done otherwise than in accordance with the provisions of these regulations." [4]

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[1] Providence, Sec. 22.

[2] Hartford, Ordinance of 1 March, 1887.

[3] New York, Revised Statutes (1895), p. 437, Sec. 6.

[4] District of Columbia, Sec. 38.

CHAPTER VI.

WATER, ICE, AND SEWERS.

A PLENTIFUL supply of pure water is one of the prime requisites of municipal sanitation. Such a supply can only be furnished through a system of mains operated by a public or quasi-public corporation. The demand for municipal water works in the United States has been very great. According to the "Manual of American Water Works" for 1897,[1] there were at the opening of this century seventeen such water works in operation. In 1896 there were 3,196. Of these water works 1,690, or more than one-half were owned by municipalities. The tendency for the city to own and operate its works seems to be a growing one, and the manual referred to gives a list covering two closely printed pages, of cities in which the water works have changed from private to public ownership. This list includes some of the most important cities of the country. The list of cities which have changed from public to private ownership is small, and the cities are small. As regards the quantity of water furnished, the cities and companies in the United States seem to have done all that could be desired. In fact they have done more than is necessary. There is little doubt that more than half the water furnished in the United States is wasted. The per capita consumption in American cities is twice as great as in European cities, and in the comparatively few American cities which are metered the per capita consumption is not half what it is in the average unmetered city.[2] It has been argued that the use of meters tends to reduce the consumption of water to too low a minimum, but such is decidedly not the experience in the city of the writer. Meters diminish waste, not the legitimate use of water.

The sources of the water supplies of the United States are very varied: lakes and ponds, storage reservoirs, rivers and deep wells being the most important. The character of the water of course varies from that which is desirable in every respect, to that which is barely endurable. There are many conditions of water which must be taken into consideration when estimating its desirability or permissibility as a municipal supply.

[1] Published by the Engineering News Publishing Company, New York.

[2] Water supplies. William P. Mason, 1896, p. 438 *et seq.*

Chemical Composition.

Water which contains too much mineral substance in solution is not desirable, as it renders the water unsuitable for boiler or laundry use.

Suspended Matter.

The chief form in which suspended matter is found in potable waters is in the form of fine silt, which is carried along by the current of a very large proportion of the rivers of the United States. More rarely organic matter of vegetable origin may be held in suspension in sufficient quantity to be an offence.

Color.

The more coloring matter the less pleasant is the appearance of the water to the consumer.

Taste and Odor.

A slight vegetable, swampy, or peaty taste is not very objectionable, but is certainly far from desirable. Unfortunately this is not the only taste which is found in water, for under certain conditions the growth and decay of algae give rise to most disagreeable "fishy" tastes, and also to bad odors. Sometimes these are sufficient to render the water positively nauseous.

Pathogenic Organisms.

The most serious contamination of drinking water is disease germs. Of these the typhoid bacillus is by far the most important. It is possible that certain diarrhœal affections may be carried in drinking water, but the evidence is not clear. Cholera is known to be disseminated through the medium of public supplies, but has not gained a foothold here for a quarter of a century, and meanwhile typhoid has claimed hundreds of thousands of victims and a very large number of the cases were undoubtedly caused by drinking the water of contaminated municipal supplies.

The health officer is, of course, most directly interested in the last form of contamination. It is his business to labor for the suppression of the infectious diseases of which typhoid is one of the most important. His chief concern is to see to it that water is free from dangerous organisms; but he should not neglect the other factors which go to make a good water supply. It is of great importance that a water supply be attractive to the eye and taste, or a pleasant, but dangerous well may be preferred in its stead. It is also very desirable that the water should be soft, so that it will be sought for in every house and every manufactory; and it is furthermore desirable that the price be reason-

able, that its use may not be restricted by the poor or by parsimonious landlords and corporations. The health officer should remember that he is doing much to promote health when he gives his influence to secure any of these desirable conditions of municipal water supply.

Usually, the health officer, particularly the local health officer, does not have very much to do directly with the control of the water supply. The actual labor of introducing and caring for a water supply is generally in the hands of the engineering or public works department, or special commissions, or private companies. Yet it is true that in certain states and cities health officials have done very much for the improvement of the water supplies within their jurisdictions.

The duties of the state boards of health in Massachusetts, Minnesota, and New York in regard to the prevention and abatement of nuisances causing pollution of potable waters will be referred to on another page. Further than this, local governments in these states and in North Carolina are required to consult with and receive advice from the state board of health in regard to introducing or extending their water supply. In Ohio the law goes further than this and requires the towns and cities to heed the advice of the state board.[1]

Besides thus specifically advising and controlling the local supplies, the state board of health may do very much by a systematic study and investigation of the existing and available supplies of drinking water for cities and towns, and by a careful investigation of the various scientific problems connected with the furnishing of a pure municipal water. The state of Massachusetts has set an example in this work which it will be difficult for others to equal and which none have yet attempted to do. The now well known results of the Lawrence filter experiments are classics in this line of work, and the Massachusetts board of health, and the men that have been associated with it, have done more than all others to awaken an interest in pure water, and, what is more, they have shown how it is possible to secure it. The board has also since 1887 conducted a systematic investigation of the water supplies of the state, and has published its results in a voluminous special report in 1890, and in its annual reports since that date. Connecticut, New Jersey, New York, and Ohio have also investigated local supplies, the latter state having recently (1898) issued a special report. The control which is exercised or the influence which is exerted by some of the

[1] Ohio, Annotated Statutes (1900), Secs. 409–25:

"And no city, village, corporation or person shall introduce a public water supply or system of sewerage, or change or extend any public water supply or outlet of any system of sewerage now in use, unless the proposed source of such water supply or outlet for such sewerage system shall have been submitted to and received the approval of the state board of health. (O. L. Vol. 90, p. 94.)

state boards above mentioned in regard to sewage disposal is of great importance in connection with the maintenance of the purity of water supplies.

Such general investigations as are above referred to should, in the opinion of the writer, be undertaken by the state as they have been in Connecticut, Massachusetts, and Ohio; but in default of this the cities have, outside of these states, been very largely obliged to do work of this kind themselves. Local boards of health have thus very generally felt it their duty to advise concerning the adoption or improvement of the water supply of their city, and have been obliged to undertake inspections and investigations in regard to its purity. It will generally be found that local boards of health are in advance of the public, and in advance of the other municipal officers in demanding the introduction of sanitary purification of water. A perusal of the reports from year to year of Baltimore, Chicago, Cincinnati, Denver, District of Columbia, Minneapolis, Philadelphia, Pittsburgh, Providence, Reading, Rochester, St. Louis, Scranton, and Syracuse will show that local boards of health have been alive to the needs of their cities and have often for years called in vain for purer water. They have made investigations and have shown conclusively that the water was dangerously contaminated, and they have also shown the remedy. Local boards of health may, outside of their advisory capacity, exert an actual control over their water by patrol and enforcing pollution laws and by carrying on systematic analysis of the water. This will be referred to on a succeeding page. The legislation concerning the pollution of potable waters will now be considered.

Prevention of Pollution by Legislation.

There is considerable statutory legislation intended to prevent the pollution of public water supplies.[1] Much of this is of a very general nature and dates back to the time when the exact danger to be apprehended in water pollution was not as well understood as it is at the present time. Much of this legislation is evidently based on the Massachusetts statute of 1843.[2] Some of the laws specify more fully than

[1] Such laws are found in California, Connecticut, Delaware, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Tennessee, Virginia, West Virginia, and Wisconsin.

[2] Massachusetts, Public Statutes (1882), Chapter 208, Sec. 7:

"Whoever wilfully or maliciously defiles, corrupts, or makes impure any spring, or other source of water, or reservoir, or destroys or injures any pipe, conductor of water, or other property pertaining to an aqueduct, or aids or abets in any such trespass, shall be punished by fine not exceeding one thousand dollars, or by imprisonment in the jail not exceeding one year."

that of Massachusetts the waters that shall not be corrupted, as water courses, streams of running water, pond, well, fountain, cistern, other place from which water is procured for drinking purposes, streams from which towns are supplied, brook, canal, river, water used for domestic purposes, or used for man or beast.

The act of pollution is sometimes more specifically defined. Thus among the things that must not be put into the water are mentioned, carcasses of dead animals, slaughter-house refuse, contents of privy vaults, cesspools and drains, human animal excrement; slops, filth, dyestuffs, drugs, chemicals, putrid, noisome, nauseous and offensive substances; decaying animal or vegetable matter and sewage; and nothing must be done to befoul or pollute the water or injure health. Usually in these laws the words "wilfully" and "maliciously" are omitted, but sometimes they are retained. In Kentucky it is forbidden to place such materials within twenty-five feet of the bank, and a later Massachusetts statute places the limit at five rods. A statute more explicit than the Massachusetts type has been enacted in New Hampshire and is given below.[1] A later law, and one making better application of our present knowledge, is that of Virginia, but it is not applicable to water sheds having an area of over fifty square miles.[2]

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[1] New Hampshire, Public Statutes (1891), 108, Sec. 13:

"If a person shall place, leave, or cause to be placed or left, in or near a lake, pond, reservoir, or stream tributary thereto, from which the water supply for domestic purposes of a city, town, or village is taken, in whole or in part, any substance or fluid that may cause the water thereof to become impure or unfit for such purposes, he shall be fined not exceeding twenty dollars, or be imprisoned not exceeding thirty days, or both."

[2] Virginia, Chapter 460 of 1892:

"SECTION 1. Be it enacted by the general assembly of Virginia, That it shall be unlawful, except as hereinafter provided, for any person to defile or render impure, turbid or offensive the water used for the supply of any city or town of this state, or the sources or streams used for furnishing such supply, or to endanger the purity thereof by the following means, or any of them, to wit: by washing or bathing therein, or by casting into any spring, well, pond, lake or reservoir from which supply is drawn, or into any stream so used, or the tributary thereof, above the point where such supply is taken out of such stream, or is impounded for the purposes of such supply, or into any canal, acqueduct or other channel or receptacle for water connected with any works for furnishing a public water supply, any offal, dead fish, or carcass of any animal, or any human or animal filth, or other foul or waste animal matter, — or any waste vegetable or mineral substance, or the refuse of any mine, manufactory or manufacturing process, or by discharging or permitting to flow into any such source, spring, well, reservoir, pond, stream, or the tributary thereof, canal, acqueduct or other receptacle for water, the contents of any sewer, privy, stable or barn yard, or the impure drainage of any mine, any crude or refined petroleum, chemicals, or any foul, noxious, or offensive drainage whatsoever, or by constructing or maintaining any privy vault or cesspool, or by storing manure or other stable fertilizer of any offensive character, or by disposing of the carcass of

The bathing in waters used for domestic supply is prohibited in Massachusetts, Connecticut, and New Hampshire within one quarter mile of intake. In Maine, Minnesota and North Dakota it is forbidden to place upon the ice any substances which would pollute the water, and in Massachusetts horses must not be driven upon such ice.[1] In North Carolina it is forbidden to "empty on the water shed of any pond or stream furnishing the source of water supply of any public institution, city or town, the undisinfected discharges of a person sick with cholera or typhoid fever." The cutting of ice on waters used for a public supply is regulated in New Hampshire.[2]

The injurious effects of cemeteries bordering upon a public water supply have been considerably discussed, and a careful consideration of the subject may be found in the reports of the Pennsylvania state board of health.[3] While it was felt that it would be dangerous for the unaltered drainage of cemeteries to flow into a river used as a source of public supply, yet the danger of locating near such a river is not very great. A law was enacted in Pennsylvania[4] that was declared unconstitutional and another was enacted in 1895.[5] This law forbids the use

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any animal, or any foul, noxious or putrescible substance, whether solid or fluid and whether the same be buried or not, within two hundred feet of any water course, canal, pond, or lake aforesaid, which is liable to contamination by the washing thereof or percolation therefrom: provided that nothing in this act contained shall be construed to authorize the pollution of any of the waters in this state in any manner now contrary to law: and provided further, that this act shall not apply to streams, the draining area of which, above the point where the water thereof is withdrawn for the supply of any city or town, or is impounded for the purposes of such supply, shall exceed fifty square miles."

Massachusetts, Public Statutes (1882), Chapter 80:

"SEC. 101. Whoever drives a horse on the ice on a pond, the water of which is used for the purpose of domestic water supply for a city or town, shall be punished by fine not exceeding fifty dollars, or imprisonment not exceeding thirty days.

"SEC. 102. The preceding section shall not apply to persons engaged in cutting or harvesting ice from such ponds, or in hauling logs, wood, or lumber."

[2] New Hampshire, Act of 28 March, 1895:

"SEC. 2. No person shall cut or take ice from any lake, pond, or reservoir used as the source of a public water or ice supply for domestic purposes for man, unless he first shall comply in all respects with such reasonable rules and regulations in regard to the manner and place of cutting and taking such ice on said lake, pond, or reservoir, as may be prescribed by the local board of control or officers of a water company, who may have charge of the works of any city or town supplying its inhabitants with water from said lake, pond, or reservoir. The supreme court shall have power to issue injunctions restraining any person from cutting or taking ice from such lakes, ponds, or reservoirs until they have complied with the reasonable regulations made as aforesaid."

[3] Pennsylvania, State Board of Health Report, 1894, p. 99, *et seq.*

[4] Pennsylvania, Brightly's, Purdon's Digest (1895), p. 274, Sec. 6.

[5] Pennsylvania, Act of 24 June, 1895.

for a burial ground of any land the drainage of which reaches a water supply within one mile of the city using the supply, but it does not apply to grounds in use at the time of its passage. The Connecticut law is given below.[1]

Besides the general legislation for the protection of water supplies that has been referred to, there has been a good deal of a special character to meet the requirements of individual towns and cities. Some of this is found in the form of special acts. One of the earliest of these was that for Philadelphia.[2] Among recent acts may be mentioned those of Paterson[3] and Manchester, N. H.[4]

In New York, where power to legislate in regard to the protection of water supplies has been delegated to the state board of health, that board has made rules, often elaborate ones, to meet the exigencies of individual cities, as Brooklyn,[5] Rochester,[6] Sing Sing,[5] New York,[6] Newburgh,[6] Elmira,[7] Syracuse,[7] Utica,[7] Mount Vernon,[8] Peekskill,[8] Saratoga,[8] and many others. The Massachusetts state board of health is authorized[9] to make similar rules and has done so for the Metropolitan Water Board (Boston), and for Cambridge. These rules are very complete and specific.[10] The North Dakota state board of health also has made regulations for the protection of potable waters.

These regulations cover a great variety of detail concerning the location and construction of privy vaults, cesspools and the care and disposal of house slops, sewage, wash water, garbage, manure, dead animals, manufacturers' wastes, etc. The rules for Brooklyn (Ridgewood

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[1] Connecticut, General Statutes (1888):

"SEC. 2655. No cemetery or place of sepulture shall hereafter be located or established within one-half mile of any reservor from which the inhabitants of any town, city, or borough are supplied with water, nor shall such reservor be located or established within one-half mile of any cemetery or place of sepulture, unless the Superior Court of the county wherein such cemetery or place of sepulture or reservoir is located shall, upon application and such notice as it may deem proper, find that such cemetery or place of sepulture or such reservoir so proposed to be located is of public convenience and necessity, and will not be detrimental to the public health."

[2] Pennsylvania, Act of 12 April, 1828.

New Jersey, Act of 28 March, 1895.

[3] New Hampshire, 1891.

[5] New York, State Board of Health Report, Vol. XV., p. 309 *et seq.*

[6] New York, State Board of Health Report, Vol. XIV., p. 565 *et seq.*

[7] New York, State Board of Health Report, Vol. XVII., p. 402 *et seq.*

[8] New York, State Board of Health Report, Vol. XVIII., 343 *et seq.*

[9] Massachusetts, Chapter 488 of 1895, Sec. 24.

[10] Massachusetts, Senate Doc. No. 4, 1900, Water Supply and Sewage, 10 January, p. 118 *et seq.*

water), cover seven pages. Other legislation forbidding the pollution of public supplies is to be found in the charters of water companies and in the special acts authorizing municipalities to construct water works.

As may be seen from the examples given, and would be seen from a study of the other laws, the penalties are as they should be, rather severe; but besides criminal action for the violation of the statutes other courses may be open for the cities that are injured by the pollution. Action may be taken to get rid of the nuisance by calling in the aid of the state board of health. In one state at least, New Hampshire, the statute directs the local government to abate the nuisance, and in Connecticut the statute directs that appeal be had tothe cou

While most state boards of health are authorized in a general way in their advisory capacity to assist cities, towns, and villages in selecting or improving their water supplies, it is only in a few states that these boards have any real power to enforce their decision or to aid the towns in bringing to justice the offenders against the laws relative to the pollution of streams. Massachusetts, Minnesota, New York, and Ohio have however given their state board of health considerable power in such matters. The action of the state board of health may relate to the abatement of nuisances on the banks of streams, or it may have to do with the more important subject of the approval of new work, and in this respect the state board of health holds a position somewhat like that of the local government board in England which exercises a control over all the municipal public works in the kingdom. The state

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[1] New Hampshire, Public Statutes (1891), Chapter 108:

"SEC. 14. The board of health of the town, or the water commissioners having charge of the water supply, or the proprietors thereof, may remove such substance or fluid; and they may recover the expense of removal from the person who placed the same or caused it to be placed in or near the water as aforesaid, in an action on the case."

The section preceding the above is given on p. 266.

Connecticut, Chapter 203 of 1895:

"SEC. 1. Section 2656 of the General Statutes is hereby amended to read as follows: Whenever any land or building is so used, occupied, or suffered to remain, that it is a source of injury to the water stored in any reservoir used for supplying any town, city, or borough with water, or to any source of supply to any such reservoir, or when any such water is liable to pollution in consequence of the use of the same, either the authorities of such town, city, or borough, or the company having charge of said water, may bring their petition to the superior court in and for the county in which said town, city, borough, or company is located for relief; and said court, upon such petition, shall have full power as a court of equity to order the removal of any building, to enjoin any use or occupation of any land or building, or of said water, which is detrimental to said water, or to make any other order temporary or permanent which in its judgment may be necessary to preserve the purity of said water.

board of health, unlike the English board, only takes cognizance of the sanitary works of sewerage and water works.

In Massachusetts[1] the state board of health on application of the mayor of a city, the selectmen of a town, or the president of a water or ice company complaining that the water or ice supply of the city or town is polluted, shall give a hearing, after due notice to all parties interested. If after the hearing, the state board of health so determines, they

"Shall prohibit the deposit, keeping, or discharge of any such material or other cause of pollution as aforesaid, and shall order any person to desist therefrom and to remove any such material theretofore deposited, or other cause of pollution; but said board shall not prohibit the cultivation and use of the soil in the ordinary methods of agriculture, provided that no human excrement is used thereon. But said board shall not prohibit the use of any structure which was in existence at the time of the passage of this act, in case the complaint referring to or including said structure is made by the board of water commissioners of any city or town, or by any water or ice company, unless the board of water commissioners or the water or ice company making the complaint, shall file with said state board of health an order or vote of its city council, selectmen, or water or ice company respectively, to the effect that such city, town, or water or ice company will at its own expense make such changes in said structure or its location as said board shall deem expedient. Such order or vote shall be binding on such city, town, or water or ice company; and, when such changes shall have been made, all damages occasioned thereby shall be paid by such city, town, or water or ice company; and if the parties cannot agree thereon such damages shall be determined by a jury on petition of either party, filed in the clerk's office of the superior court in the county where the premises are located, in the manner provided by law in relation to determining the damages occasioned by taking land for highways in such city or town, or in the case of a water or ice company, in the city or town in which said structure is located."

The succeeding sections of the law relate to appeals and to the power of the courts to enforce the orders of the board. The Minnesota law is quite similar.

In New York[2] the state board of health may make rules and regulations in regard to the protection of water supply, and such regulations may even go so far as to require the construction of municipal systems of sewerage, the removal of buildings and interference with industries; but in all cases the water company or municipality benefited must bear the cost. If a regulation of the state board is violated the state board may investigate and direct the local board of health to enforce the regulation. By the act of 1892[3] a town may bring action against parties who pollute its water supply, provided the fact of pollution is attested by the state board of health and also provided that the town does not itself pollute a stream.

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[1] Massachusetts, Chapter 510 of 1897, Sec. 3.

[2] New York, Revised Statutes (1895), p. 2437, Secs. 70–2.

[3] New York, Revised Statutes (1895), p. 2439, Sec. 72a-d.

Of course, statutory legislation in regard to water protection is much more important and useful than any local regulation can be, for it is only in rare instances that the source of a municipal supply is entirely within the city's jurisdiction. A part of the supply, however, often is within the city limits, and sometimes as in Chicago, the whole of the pollution comes from the city itself. A considerable number of cities have therefore made rules for the protection of their water supplies. Usually these rules have no special legislative sanction, though in Illinois[1], and New Jersey[2] local governments are authorized to make such regulations. In New Jersey the board of health is given this power. The provisions given below were found in Brooklyn[3] and regulations of a similar general character have been adopted in Augusta, Ga., Chicago, Cincinnati, Denver, Memphis, Omaha, Yonkers, and other cities.

It makes very little difference what legislation there may be concerning water pollution, unless active measures are taken to maintain a constant supervision over the water and the banks of the rivers or lakes from which it is obtained. There are two means which may be combined in securing this supervision. One is the inspection or patrol of the water shed, and the other is the laboratory study of specimens of the water. Patrol of the banks of lakes or streams which are likely to yield contaminated water is of the utmost value. Even when not backed by sufficient legislative power, the inspector, if diligent, alert, and tactful,

[1] Illinois, Annotated Statutes (1896), Chapter 24, Sec. 126.

[2] New Jersey, General Statutes (1895), p. 1647, Sec. 49 (XII).

[3] Brooklyn, Sanitary Code:

"SEC. 46. That no person shall throw or allow to run or pass in any public reservoir, water pipe or aqueduct, or into or upon any border or margin thereof, or excavation or stream therewith connected, any animal, vegetable or mineral substance whatever; nor shall any person allow the same to be done (having power or right to prevent the same), nor shall any person do or permit to be done (having right or power to prevent the same), any act or thing that will impair or imperil the purity or wholesomeness of any water or other fluid used or designed as a drink in any part of said city; nor shall any person bathe nor (except in the discharge of public duty) put any part of his person into such water, nor shall any unauthorized person open any erection or unscrew any hydrant holding such water.

"SEC. 47. That it shall be the duty of every person, officer, department and board, having any authority and control in regard to any water designed for human consumption (and within the proper sphere of the duty of each thereof), to take all usual and also all reasonable measures and precautions to secure and preserve the purity and wholesomeness of such water.

"SEC. 48. That no person shall destroy nor in anywise injure or impair any drinking hydrant, or part thereof, in the said city; nor shall any person interfere with the use of or enjoyment of the water therein, or therefrom, or interrupt the flow thereof, or as a drink; nor shall any person put any dirty, poisonous, medicinal or any noxious substance into or near said water or hydrant, whereby such water is made or may be regarded as dangerous or unwholesome as a drink."

can accomplish no mean results. If the laws are capable of enforcement he can of course do much more.

When the water supply of a city comes from a very large water shed, particularly if it is situated partly outside of the state in which the city is located, it is hardly practicable to accomplish much by patrol. So, too, when the chief source of pollution is municipal sewage, patrol can be of little avail. There are, however, many cities which take their water from a small area where the pollution is mostly from isolated houses, barns or mills, where patrol may give a very great degree of security, particularly if there is good statutory law against pollution. Many cities have adopted this method of protecting their supplies. Most communities having a doubtful supply have probably made occasional efforts to improve it by the personal visits of an inspector, but some have gone farther than this and maintain a permanent supervision. Providence began in 1875 with a thorough investigation of the sources of pollution of its public supply. During the next ten years the board of water commissioners attempted, under a very defective law, to get rid of most of the contamination. The health department then made several inspections of the water shed, and the presence of typhoid fever called attention to the subject, and a man was employed a considerable part of the time to look after the nuisances along the banks. Since 1889 an inspector employed by the commissioner of public works at a salary of $1,200 has devoted all his time to the work, and recently another inspector has been employed at a salary of $1,000, and though there has been a great increase of population, there is far less pollution than at any time since the supply was made use of. In Baltimore[1] since 1896 an inspector, a physician, under the health department, has made daily inspections of the water shed and has secured many voluntary abatements of dangerous nuisances; but all offenders have not willingly complied with his requirements, for in 1897,[2] of ninety-five orders, fifteen were followed by suit. About the same time the Brooklyn health department[3] established a laboratory at a convenient location on the water shed of its supply, and together with a daily collection and examination of specimens, made note of all possible sources of contamination. Interesting photographs of some of these offenses are shown in the report for 1895, page 272. In Manchester, N. H.,[4] where the water supply is taken from a lake, the shores of which are occupied by

[1] Baltimore, Report of Health Department (1896), p. 11.

[2] Baltimore, Report of Health Department (1897), p. 16.

[3] Brooklyn, Report of Department of Health (1895), p. 272; (1896), pp. 123 and 216.

[4] Manchester, Report of Board of Health (1897), p. 25.

summer cottages and are used for picnics, the board of health maintains a daily inspection during the summer season, and on Sundays and holidays the inspector is on hand all day. Bathing and washing are prevented, also the flow of sewage, and the throwing of rubbish in the water. The Newark[1] and Scranton[2] boards of health make annual inspections.

Another method of supervising the water supply is by frequent examinations of the water itself. There are three general laboratory methods of testing water. One of these, the oldest method, is the chemical examination, which consists chiefly in estimating the amount of the different forms of nitrogen "albuminoid ammonia," "free ammonia," nitrites and nitrates, and also the amount of chlorine present. Contrary to the popular notion, the interpretation of the results of the chemical examination of the water is by no means easy. A chemist must have a full knowledge of the history of the water in order to form even an approximate estimate of its sanitary condition. Nevertheless, the chemical examination of drinking water is of very great importance, and much information can be derived from it which is of value in determining whether or not a given water may safely be used for drinking. Of late years the biological examination of water has come to be considered important, and here again two methods are made use of for the study of two classes of organisms. The *algæ* are plants of considerable microscopic size and they can be isolated and studied by filtering a sample through a coarse filter and washing the filter in a small volume of water which may be examined at once under the microscope. The role played by these organisms in producing disagreeable odors and tastes in certain waters has made such microscopical examination of water very useful in the care of waters that are likely to be so affected. Lastly the bacteriological method of water examination has been made use of to study those minute organisms which can only be isolated and studied by growing them in artificial culture media. The number of bacteria present in waters is often an excellent index of their contamination, and the presence of certain species is of still greater value. The presence of tyhoid or cholera organisms would of course condemn a water, and the presence of any form of bacteria characteristic of fecal matter should do the same. The proper study of municipal water supplies requires then the inspection of the source of the supply, the chemical and bacteriological examination of samples, and often the microscopical examination also. Cities which wish to secure or maintain as good a water supply as possible cannot afford to neglect any of this work, though

[1] Newark, Report of Board of Health (1897), p. 24.

Scranton, Report of Board of Health (1894).

the completeness with which it is necessary to follow it out will vary in individual cases.

In a number of cities the examination of water samples is in the hands of the board of health, partly because the health department appreciates more fully than any other department the necessity for vigilance in such matters, and partly because other laboratory work is done by that department, rendering the employment of chemists and bacteriologists a necessity. Among the cities in which the health department carries on regular chemical examinations of the public water supply may be mentioned Baltimore, Brooklyn, Buffalo, Chicago, Denver, Hartford, Lawrence, Newark, and New York City.

Bacteriological tests are made in Albany, Buffalo, Denver, Hartford, Lawrence, Newark, and New York City.

Microscopical tests are carried on very extensively in Brooklyn under the direction of George C. Whipple, and at Albany, Boston, Lynn, Pittsburgh, and to some extent at Buffalo, and also by the water company at Wilkesbarre, Penn. Sometimes water tests are made monthly as in Rochester, bi-monthly as in Providence, bi-weekly as in Hartford, weekly as in New York, or daily as in Buffalo.

A law was passed in Michigan[1] in 1897, by which, on resolution of any municipal council, water may be sent to the state university for analysis, the municipality to pay only the cost of materials used in making the analysis.

Purification of Public Water Supplies.

It not infrequently happens that it is practically impossible for a community to secure a water supply which is free from dangerous pollution. It is of course wise to keep in mind the maxim of Dr. Kedzie, that what is needed in water supplies is "innocence not repentance," nevertheless an "innocent," supply cannot in some cases be obtained [illegible] The community must [illegible] The most essential thing [illegible]

[illegible]

the proper construction and cleansing of reservoirs. Reservoirs with hard, clean bottoms, particularly if they are deep, are unfavorable to the growth of algæ, but certain waters will grow algæ even in deep reservoirs or tanks. This is particularly true of ground waters, and in such cases the reservoirs may be covered, as the algæ will not grow without the sunlight. In Boston where the supply was drawn from several sources, it was found that the algæ rarely grew in more than one reservoir at a time, and by care that could be shut off before harm was done.

There are three practical methods of purification in use, aeration, sedimentation and filtration.

Aeration.

At one time it was believed by many that this would do much towards purifying water, even if dangerously polluted. It is now known that this was a false hope and the field for aeration is much restricted. It is now rarely employed and only to get rid of odors and tastes. Among the cities which make use of aeration are Rochester and Albany.

Storage and Sedimentation.

This method of purifying water by allowing time for the suspended matter to settle to the bottom, has long been employed to clarify muddy waters. It has only within very recent years been learned that this is also a most excellent method of getting rid of disease germs, and indeed of all kinds of bacteria. The pathogenic bacteria which are feared in drinking water, do not thrive in that medium, but rapidly die out. These as well as the other non-pathogenic forms are largely carried to the bottom by their own weight, or by the precipitation of other materials. River waters stored in large reservoirs often lose in a few weeks ninety to ninety-five per cent. of their bacterial contents. While reservoirs are frequently constructed for the purpose of removing silt from water, they have probably never been constructed for the express purpose of freeing water from pathogenic organisms, and they are not likely to be; but in any consideration of water works construction or extension, it is well to keep in mind this useful result of the storage of water. Unfortunately the storage of water has, as has been shown, its disadvantages as well as its advantages, for the storage of certain waters very greatly favors the growth of algæ.

Filtration.

The first extensive successful filters were those constructed by the London water companies. These filters have now been in use about fifty years. They are in most instances greatly assisted to their success by the large storage reservoirs in which the water remains a considerable

time before it is allowed to pass on to the filter beds. The excellent results obtained by these filters and their storage reservoirs was largely due to a happy chance, for at the time they were built and for many years afterwards, the true nature of the dangerous constituents of river water was not known. It was only with the development of bacteriology that the action of filters could be studied in a satisfactory and scientific manner, and rational deductions made for their improvement. Though for many years and to a very recent date the London filters served as the best models, yet it was not from their management that a correct knowledge was derived of the way in which filters should be constructed and operated. It was the engineer of the Berlin water works and the officers of the Massachusetts state board of health who first placed the art of filtration on a scientific basis.

While filters are exceedingly common on the continent of Europe they have not been used at all in the United States until a quite recent period, and then usually in a very unscientific manner. The European filters are almost without exception patterned on the London model. They consist of beds of sand through which the water slowly percolates downwards. In the United States nearly all the filters until within the last two or three years have been of a very different type. In them the water is passed rapidly through the sand, and before its passage there is added to it a small amount of some coagulant such as sulphate of alumina. The bed of the filter is frequently agitated to clean it. The European method is in the United States usually spoken of as "natural filtration" and the latter method as "mechanical filtration," though neither of these terms is desirable or descriptive of the process.

Natural Filtration.

Most natural filter beds are provided with sedimentation basins of varying capacity in which the water may deposit a part of its impurities before it passes on to the filters. In the case of very muddy waters such a basin or reservoir is a necessity. A filter consists of a bed of sand of about an acre in area and enclosed by masonry or other embankment. Some beds are much larger than that, and some smaller, but an acre is a convenient size. The sand bed consists of several layers, course materials being placed at the bottom and about two feet of a moderately fine sand at the top. It is this layer that is the essential part of the filter and it is quite necessary to secure sand of the right quality; it should be sharp but even. The total thickness of the filter is from four to six feet, and it has a system of under drains at the bottom which carry off the filtered water to the reservoir or pump well as the case may be. The filter is filled beneath to drive the air out and the water is allowed to stand at a depth of three to six feet above the

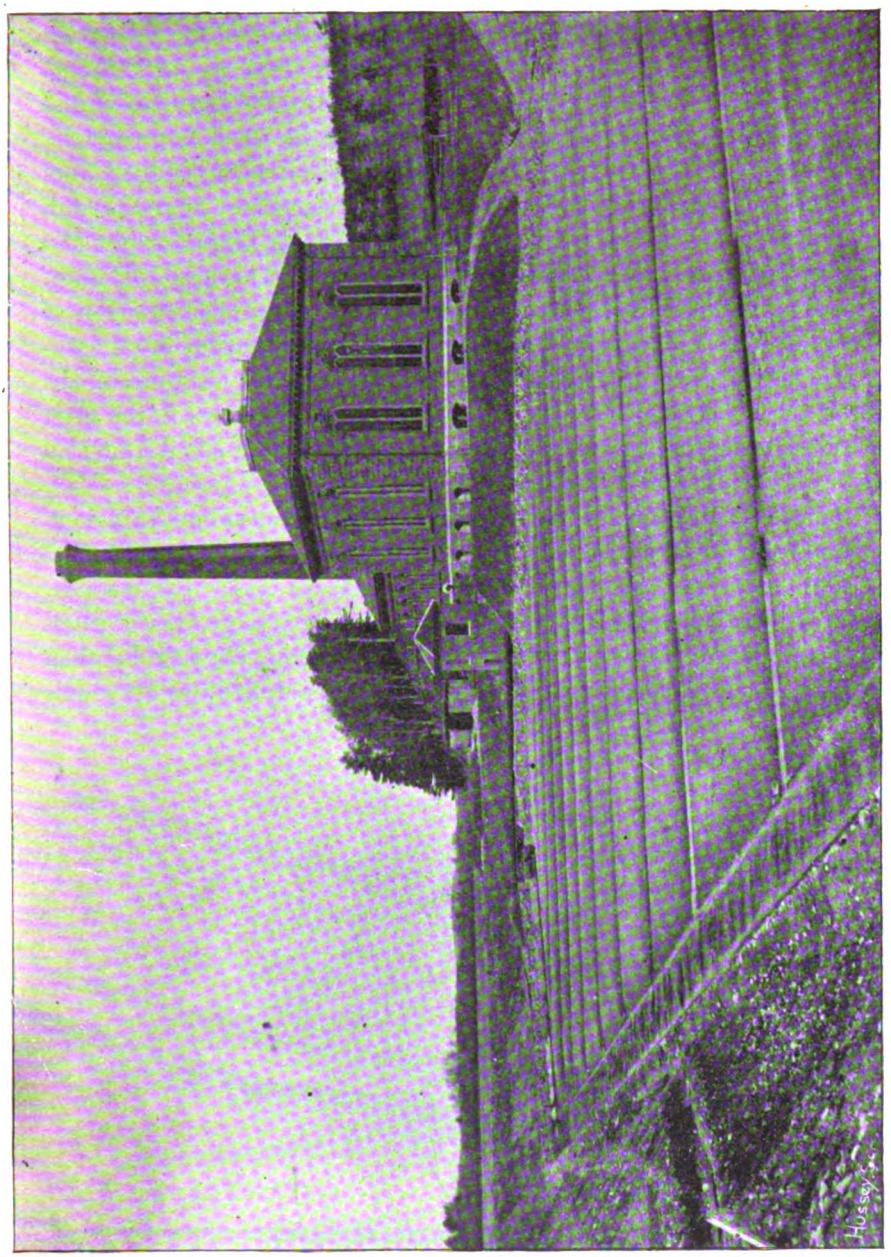


FIG. 5.
Water Filter with Pumping Station and Gate House, Lawrence, Mass.

surface of the sand. Often the water is allowed to rest for twenty-four hours before the filter is started, and the first water which passes through runs to waste. The efficiency of the filter depends upon the layer of dirt and slime which is precipitated upon the surface of the sand from the water standing upon it and from that which first passes through. The efficiency of the filter is also in a general way the converse of the rate of filtration, the higher the rate the less is the water improved by its passage. The rates now deemed most advantageous range from 2,000,000 to 4,000,000 gallons per acre each twenty-four hours. With the increasing deposit of sediment on the surface of the filter, less and less water will pass through under a given head. The head of water on these filters does not usually exceed four feet. Various contrivances are employed to regulate the head of water on the filter but in all cases constant supervision is necessary. When through the clogging of the filter the rate becomes too slow to furnish the needed water, the filter has to be cleaned by drawing off the water and scraping about a half an inch from the surface of the sand.

In cold climates much difficulty is experienced in cleaning the filter in the winter time. It is necessary to wait for a thaw when the ice is melted or else to cut it and remove it. Care must also be taken that the sand does not freeze when the water is drawn. If a very large area of filtering surface is provided so that the rate may be slow, the time between scrapings may be lengthened so as to lessen the difficulties of winter

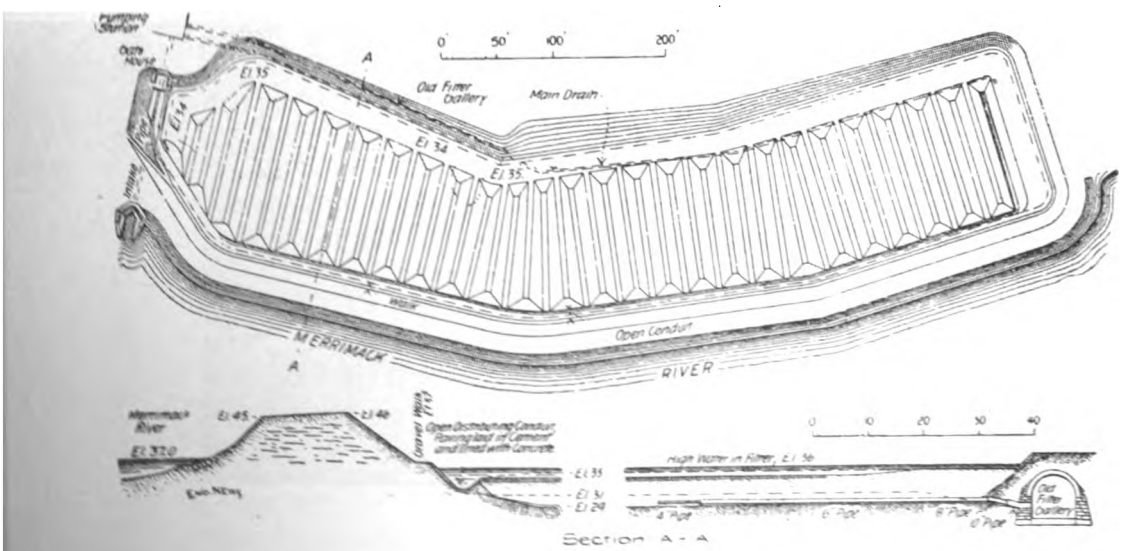


FIG. 6.

Plan and Section of Water Filtration Bed, Lawrence, Mass., Hiram F. Mills, Designing Engineer.

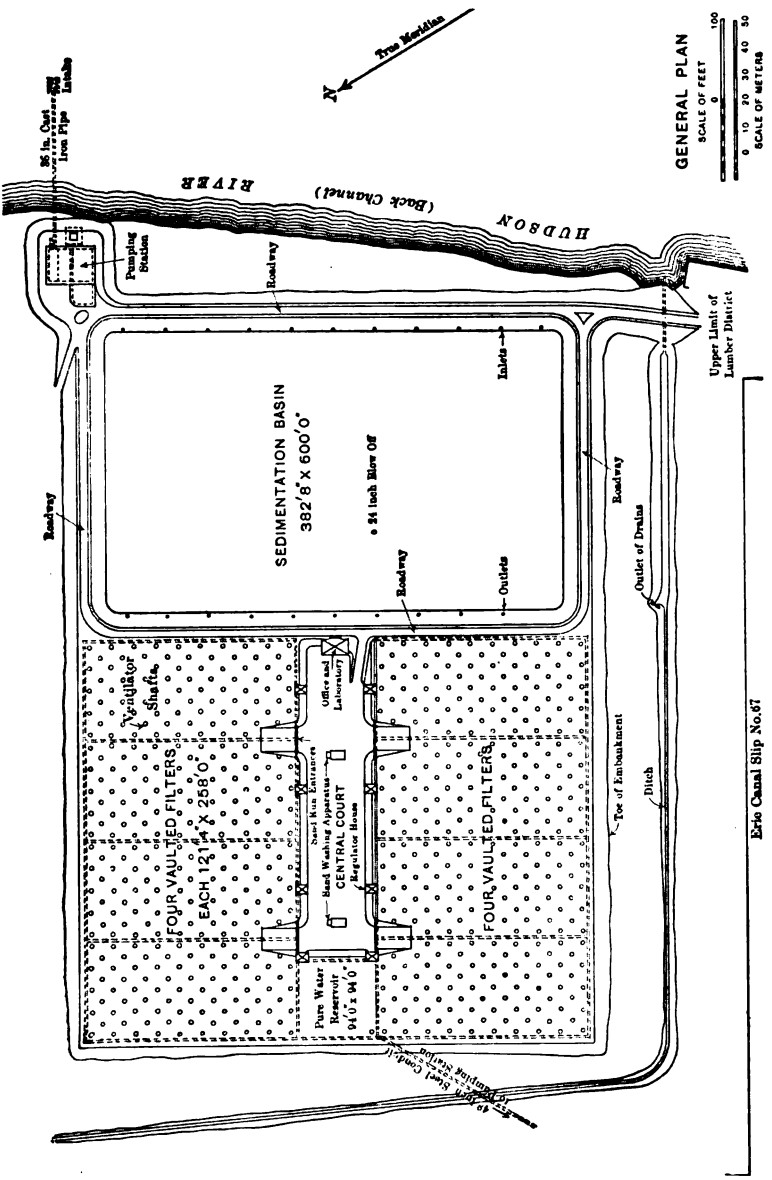


FIG. 7.

Plan of Albany Filter Plant.

[illegible] the best method in regions where the temperature falls [illegible] the filters.

[illegible] sand filter constructed in this country was at [illegible] has never been carefully operated for the purpose of [illegible] and comparatively few bacterial counts have been made of the water. The cost of cleaning is said to be $[illegible] per million [illegible] from these figures as to the cost of [illegible] bacteria efficiency. Small sand filters have also [illegible] Conn., Lion, N. Y., Nantucket, Mass., [illegible]

[illegible] was built at Lawrence, Mass., for the purpose [illegible] bacteria from the Merrimac River water. [illegible] work well for Lawrence has since [illegible] were formerly so common. [illegible] area of two and one-half acres and was intended to [illegible] gallons. See Figs. 5 and 6 from plates loaned [illegible] of the Lawrence Water Works. This filter is [illegible] according to the best design, and in a climate as cold as [illegible] covered. Hence the cost of cleaning is high. [illegible] be taken as an indication of what the cost of [illegible] the best form of modern filter would be.

A filter was put in operation in Albany in 1899 which may be considered representative of the best ideas in regard to sand filtration. This filter[1] consists of a series of eight basins having an area each of about 0.7 of an acre. The normal rate of filtration is 3,000,000 gallons per acre daily, and with one basin out of use for cleaning, the capacity of the whole filter would be 14,700,000 gallons per day. The cost of the filters was about $255,000 exclusive of land and engineering.

In order to protect them from freezing the filters are arched over with brickwork supported on brick piers. The whole is covered with two feet of earth and grassed over. Access is gained through numerous manholes which are protected by double steel covers. The tops of the manholes are carried up six inches above the grass. The water is collected underneath the filter by six-inch vitrified drains laid with open joints. The pipes are of this large size in order to prevent the slightest friction and consequent irregular action of the filter. The collectors are thirty-inch pipes.

The gravel surrounding the under drains is of three grades. The first immediately surrounding the drain consists of stones, one to two

[1] This account of the Albany filter is taken from the Proceedings of the American Society of Civil Engineers, November, 1899, and the electrotypes for the accompanying illustrations were loaned by the society.

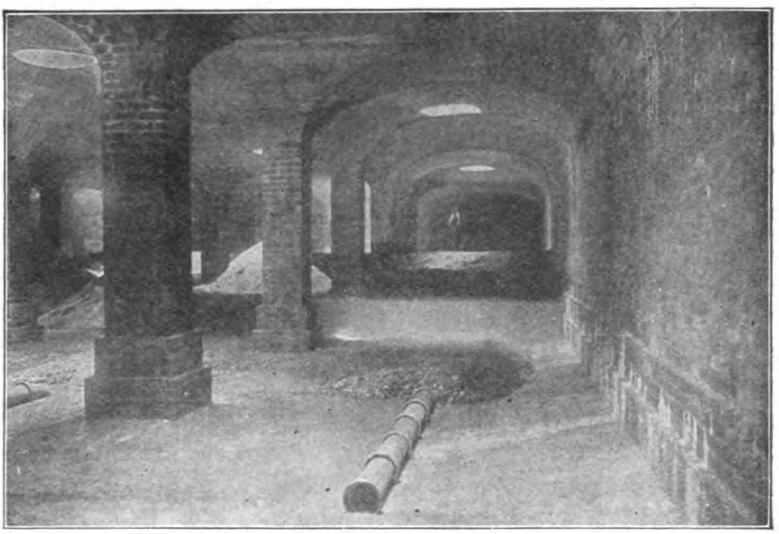


FIG. 8.

Interior view of the Albany Filter, showing drains before they were covered with gravel.

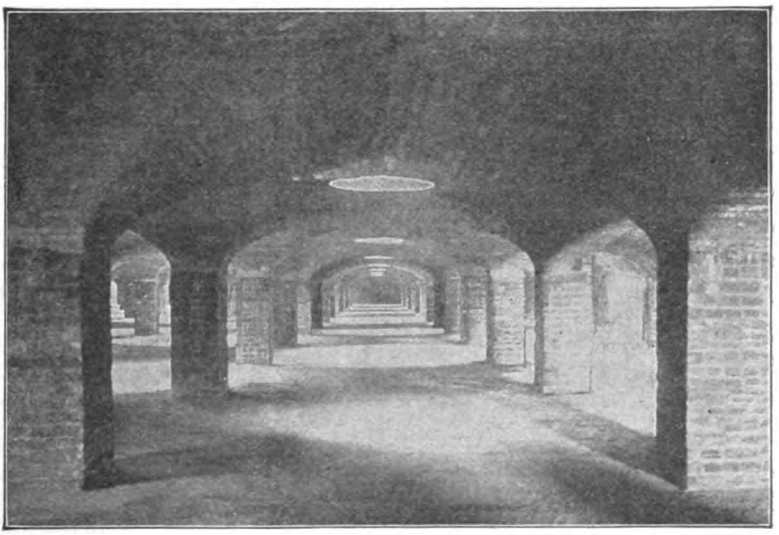


FIG. 9.

Interior of Albany Filter, showing sand in place before water is turned.

[illegible] inch and [illegible] intermediate, between [illegible] diameter. The [illegible] the gravel is [illegible] that it shall be clean [illegible] rounded grains, [illegible] The sand has [illegible]

The [illegible] is thoroughly washed [illegible] sand-washing machines [illegible] the filters. In them the [illegible] an ejector, after [illegible] which it is again [illegible] through five ejectors [illegible] The sand is [illegible] to deposit from the water.

The [illegible] states that the filters were [illegible] and by the end of the year they had [illegible] per cent. The cost of [illegible] gallons. This included laboratory supervision.

Mechanical Filters.

These filters consist [illegible] wooden or metal tanks. One type of the filter [illegible] sometimes a vertical, closed tank [illegible] quartz. When it is necessary to clean the filter the current of water is reversed through the effluent pipes and the sand is cleaned by the action of the water. Various types of pressure filters are made by the New York Filter Manufacturing Company. Such filters are in use at Oakland, Cal., Atlanta, Long Branch, Kingston, N. Y., Asheville, N. C., Raleigh, Nashville, Davenport, Ia., Little Rock, Ark. This filter is shown in Fig. 11.

A style of filter similar to the above has recently been put on the market by the Continental Filter Company, in which the agitation of the sand during washing is accomplished by the use of compressed air. This filter is in use at Asbury Park, N. J., and Vincennes, Ind.

The gravity type of mechanical filter is represented by the Morrison-Jewell filter, made by the New York Filter Manufacturing Company. This filter consists af an open perpendicular tank of wood or steel with about two feet of crushed quartz in the bottom. In this quartz are a series of rakes which can be rotated by machinery. When it is necessary to clean the filter the current of water is reversed and sent up through the

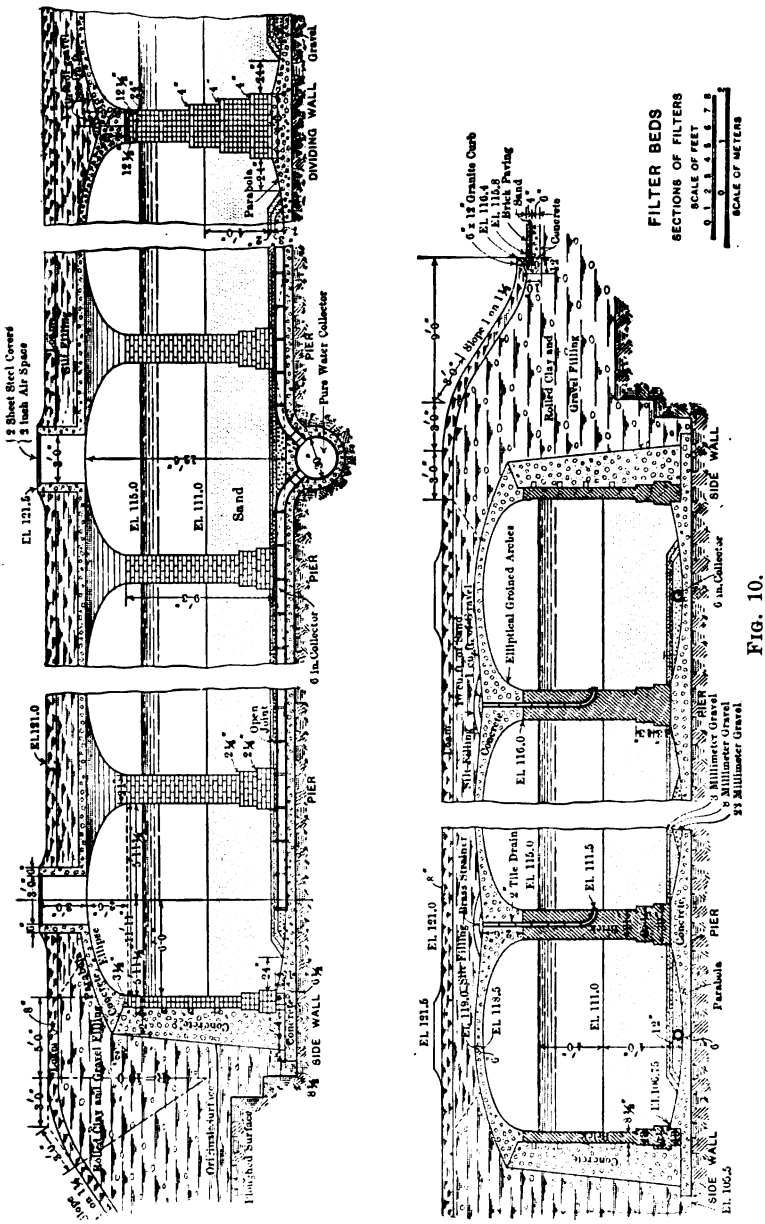
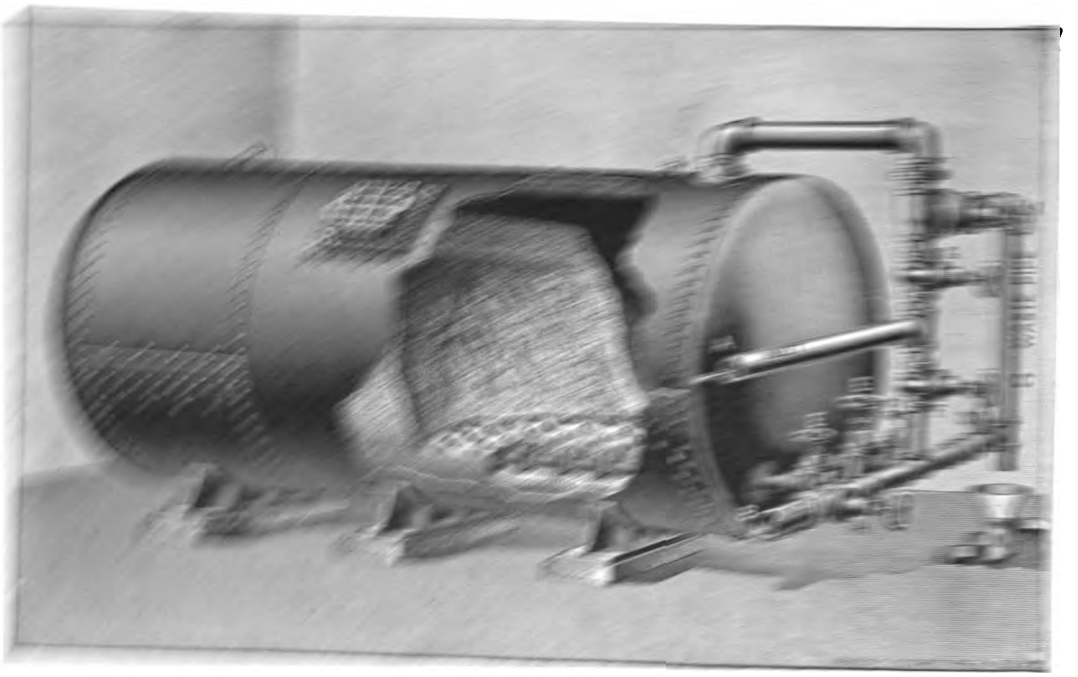


FIG. 10.

Sectional View of the Albany Filter.



[illegible]

[illegible] Niagara Falls, N. Y., [illegible] R. I., Columbia, S. C., Knoxville [illegible] of these plants furnish as high as 9,000,000 [illegible] gallons per day.

The rate of filtration in these mechanical filters is very high, so that only a small area of tank is needed to supply a large amount of water. With a rate of [illegible] gallons per acre per day, a tank fifteen feet in diameter will give a practical daily yield of 500,000 gallons of filtered water.

The mechanical filters can only be operated by the addition to the applied water of some coagulant. The salts of aluminum or iron are usually employed and the commercial sulphate of alumina is preferred. The [illegible] some of the dissolved organic matter

in the water, but it acts chiefly through the flocculent precipitate of hydrate of alumina which is formed by the decomposition of the sulphate by the carbonates naturally in solution in the water. The amount of sulphate of alumina which it is necessary to add varies from 0.6 to 3 grains per gallon. The precipitated hydrate falling on the surface of the sand serves the purpose of the layer of slime in the natural filter to catch the bacteria and other suspended particles. If the sulphate of alumina is properly used, none of the undecomposed sulphate or of the precipitated hydrates passes into the effluent.

Very few tests have been made of the bacterial efficiency of this type of filter except on experimental work at Providence, Louisville, Cincinnati, and Pittsburgh; but as in some of these experiments, filters of ordinary size, operated in the ordinary way, were used, there is no reason why the experimental results should not be considered fairly satisfactory. In the Cincinnati experiments, according to Fuller's report, over ninety-nine per cent. of the bacteria were removed.[1] A six weeks' test made during the ordinary runs of the East Providence filter showed a bacterial efficiency of 99.20 per cent. At Lorain, O., the filters were tested under the direction of the state board of health and showed a high degree of efficiency. While several of the mechanical filters, so

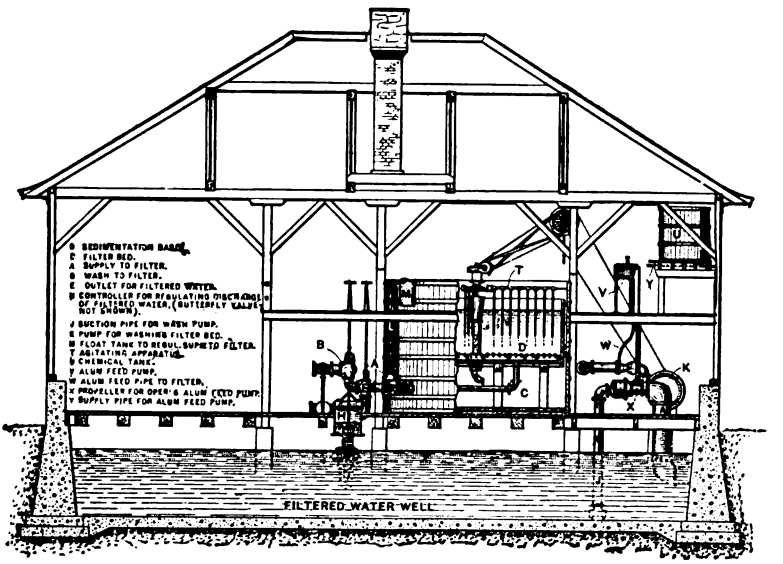


FIG. 12.

Mechanical Filter. Section of East Providence Filter House. (From plate loaned by American Society of Civil Engineers.)

[1] Report of the Investigations on the Purification of the Ohio River Water, by the Board of Trustees, Cincinnati, 1899.

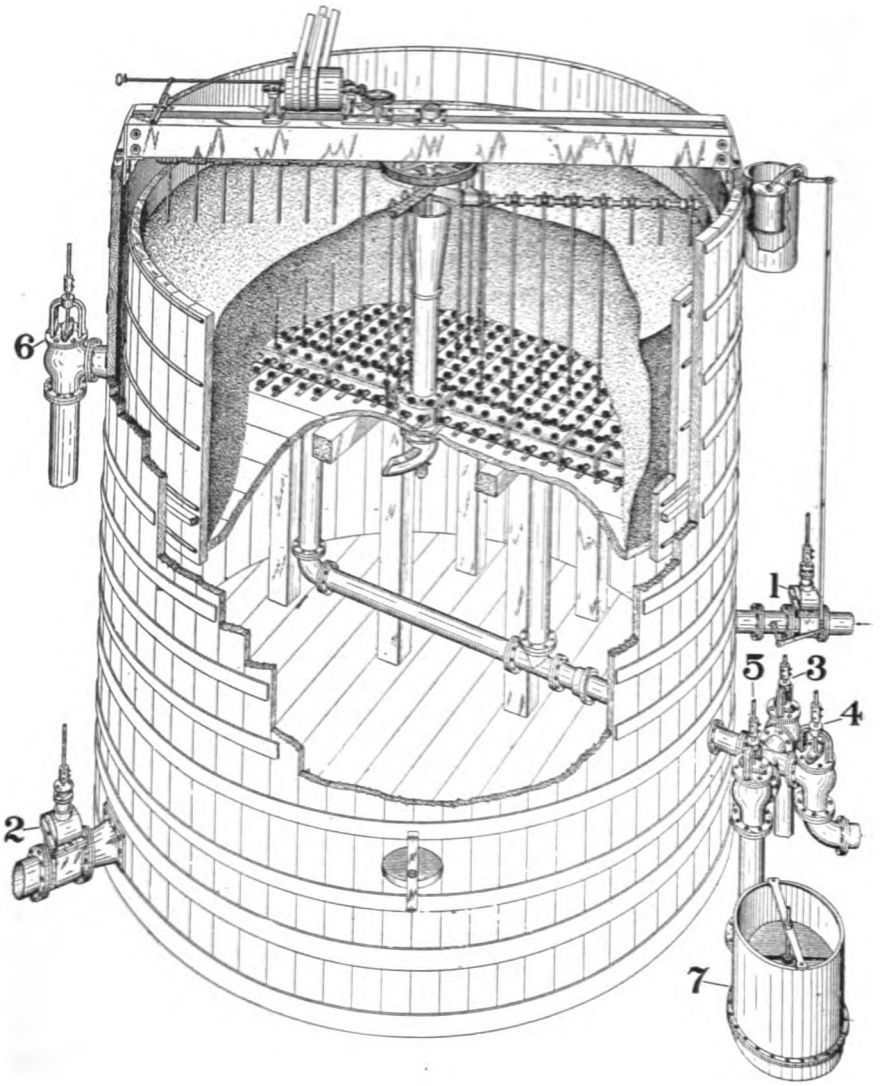


FIG. 13.

Seventeen Foot Jewel Subsidence Gravity Filter.

called, were installed largely for the purpose of freeing the water from pathogenic organisms, none of them are operated under bacteriological control.

That the removal of ninety-seven to ninety-nine per cent. of the bacteria from polluted water is sufficient to remove the danger due to the presence of disease germs is amply proved by many well known examples. The history of Altona and Hamburgh in the cholera epidemic of 1886 is known to almost every one. The freedom of London from typhoid

and the history of typhus in Zurich, Buda-Pesth and Berlin, as well as the good results obtained in our own country at Lawrence, show that filters may be relied on to remove pathogenic bacteria from water. There has yet been no opportunity to show similar brilliant practical results from the use of mechanical filters, but as they do the same bacteriological work they will doubtless when the opportunity presents, prove as useful as the natural filters.

The cost of constructing natural filters is considerably more than for mechanical filters, particularly if the former have to be covered. The cost of operating appears to be not very different. Every individual city must make a special study of its own conditions and only after seeking the best expert advice decide upon that method of improving its water supply which best suits its needs.

WELLS.

It is an unquestioned fact that wells are sometimes contaminated in such a manner as to cause disease in those who drink their waters. There are many notable instances of such on record and most health officers of extended experience have had personal knowledge of epidemics caused in this way. Cholera and typhoid are the two diseases which without question may be spread through the agency of well water. While the danger from contaminated well water must be admitted, the degree of danger is not so apparent, though it is believed by those who have given it most attention to be very considerable. It is usually stated that the introduction of a reasonably pure public supply in cities almost always results in a diminution of the death rate from typhoid fever, and many statistics are presented to support this view. There are several classes of wells, the dug wells, or the shallow driven wells which penetrate less than a hundred feet, and the deep or artesian wells which may extend one or two thousand feet into the earth. As a rule the more shallow the well, the more liable it is to contamination, but quite deep driven wells are sometimes contaminated. The danger in the use of wells depends in the main, probably on their contamination with human excreta contained in the seepage from privy vaults and cesspools, or the leakage from drains. Well water is usually more palatable than the softer waters which are generally furnished in public supplies, and in summer are desired on account of their coolness. Unfortunately a small amount of contamination, entirely too small to be detected by taste or smell, is amply sufficient to cause disease. Hence it often requires considerable pressure either through persuasion or at the hand of the law, to prevent persons from drinking dangerous water. Fortunately there are factors which tend to discourage the use of well

water. City water is generally introduced into dwellings for convenience in washing, cleaning, and bathing. Once in, it is more convenient to use it for drinking than it is to use well water, and, moreover, as long as the cost of the city water has to be borne, it is considered a waste to spend money to keep pumps and buckets in order, or to clean the well. Hence in most towns with a public water supply, the wells fall rapidly into disuse without any compulsion. Thus in the city of the writer, fourteen years after water was introduced, there were only 1,424 wells in use, though no effort had been made by the city to close them. The use of many thousands had voluntarily been given up. At that time the population of the city was about 118,000 living in over 15,000 dwellings, and there were towards 13,000 connections with the water mains. Compulsion is, however, at times necessary to secure the abandonment of a dangerous well, and this is particularly necessary where the water rates are unreasonably high.

There are various ways of gaining information as to the dangerous character of a well. One of the most useful is an inspection of the surroundings. If there are cesspools, privy vaults, or drains, especially such drains as are liable to be defective, near a well, it is likely to be contaminated. As a rule the nearer the source of contamination, the greater the danger; but much depends on the character of the soil. A sandy soil is the least dangerous, a seamy rock the most. A well on the premises where the writer formerly lived was contaminated by a privy vault 300 feet up the hill, but only after there had been a large amount of blasting in the neighborhood, which probably opened up new seams in the rock. No hard and fast rules can be given as to the desirable distance of a well from a cesspool, but the inspector must bring to bear an experienced judgment and must take into account the character of soil, depth of well, and direction of flow of ground and surface waters.

Secondly, chemical examination is of very great assistance. It furnishes a pretty safe indication of the amount of organic and excremental pollution, but here, too, the analysis must be interpreted with care and intelligence.

Lastly, a biological examination may be made. If typhoid or even suspiciously fecal bacteria are found, the question is settled, but on the other hand their absence gives no surety for the safety of the water. Bacteriological tests are difficult to apply, and of comparatively little value.

It is often necessary for the person on whom the responsibility rests to carefully consider every point, but when the alternative is a reasonably pure municipal supply, the well ought never to be given the benefit of the doubt.

There is very little statutory legislation in regard to wells. The general provisions concerning the pollution of potable waters sometimes mention wells, but not usually. In two states at least there is some provision made for the closing of wells. Thus in New Hampshire:[1]

"Whenever any well, spring, or [other] water supply is suspected of being polluted by sewage or other matters dangerous to health, the health officer or officers in any town or city where such water supply exists may cause an analysis of the suspected water to be made by a competent chemist, without expense to the owner, and if the analysis shows the water to be unfit for drinking purposes, said health officer or officers, upon obtaining the indorsement of the state board of health may prohibit its use, and, if it be from a well, may cause the same to be closed if in the judgment of said state board of health such action is necessary. The state board of health shall authorize such investigations whenever deemed necessary for the public good."

In New Jersey[2] the local board of health may "order not to be used or close any well, the water of which is polluted or detrimental to the public health." In the absence of such statutory authority, the local government may make regulations or issue orders under a general grant of sanitary power, and many cities or boards of health have done so. Among cities that have done so are Bridgeport, Denver, Fitchburg, Haverhill, Indianapolis, Memphis, New Orleans, New York City, Omaha, Rochester, Scranton, Spokane, St. Louis, and Yonkers.

One of the provisions sometimes adopted is that vaults, cesspools, and drains must be located a certain distance away from the well. Some of these rules were referred to on page 176. A rule somewhat different from those which specify the distance of possible sources of pollution is found in Fitchburg.[3]

Instead of attempting to protect wells, most cities, towns, and villages, with a good public water supply, consider it the best policy to discontinue the use of all wells, or at least of all wells that are considered likely to be dangerous. There are few cities which have absolutely ordained that all wells shall be abandoned, but in Erie[4] well water must not be used when it is possible to make connection with the city water, nor if the well is within 100 feet of a vault or cesspool. Sometimes the use of wells is forbidden unless a permit is granted.[5] A similar

[1] New Hampshire, Public Statutes (1891), Chapter 108, Sec. 17.

[2] New Jersey, General Statutes (1895), p. 1644, Sec. 49 (XII).

[3] Fitchburg, Rules and Regulations of the Board of Health (1897), p. 11, Rule 2:

"No cesspool or privy, or privy vault shall be established on land where there is any well, spring, or other source of water supply used for culinary or domestic purposes, except by special permit in writing first obtained from the board of health."

[4] Erie, Rules and Regulations of Board of Health (1898), p. 19.

[5] Rochester, Ordinances of Board of Health, Number 20:

"Water from wells in the City of Rochester shall in no case be used for drink or in the preparation of food for human beings, except under and pursuant to the con-

rule is found in the sanitary code of the City of New York, but it only applies to tenement and lodging houses, and hotels and office buildings.[1]

In New Orleans[2] no one may use water from any well, canal, sewer, ditch, or other excavation in the ground "for the purpose of making bread or any other article intended for human consumption or subsistence," or for washing utensils used for preparing food or drink.

Most of the municipal regulations have reference to the abandonment or closing of wells. In southern cities as Memphis where cisterns are often used to furnish domestic supply the board of health may close them also. Sometimes the rule or ordinance requires the health officer or board of health to close the well when he "is satisfied" that it is dangerous or polluted, or when he "finds it" so, or when it "appears on examination" or "on satisfactory evidence" to be so. In St. Louis[3] whenever a chemical analysis shows a well to be impure or unwholesome, it shall be deemed a nuisance. In Omaha the well is to be condemned by a chemical or other test, and in Denver if a chemical test or its location shows it to be probably unwholesome. As was stated above, chemical analyses have to be interpreted with some caution and with reference to the location of the well, hence arbitrary standards of purity are not usually established; but in St. Louis[4] such a standard was adopted upon the advice of a committee of expert chemists. The standard is as follows: All wells are to be condemned as impure and unwholesome which contain:

"First, more than 0.05 parts of nitrogen in the form of nitrates per million parts of water; or, second, more than 0.01 parts of nitrogen in the form of nitrates per million parts of water, in conjunction with 0.15 parts of nitrogen in the form of "free" ammonia per million parts of water, and 100 parts of chlorine per million parts of water; or, third, nitrogen in the form of "albuminoid" ammonia to the extent of 0.2 parts per million parts of water; or, fourth, phosphoric acid or phosphates as acertained by the characteristic turbidity produced upon the addition of ammonia molybdate."

After it has been determined that a well is to be abandoned, a notice is issued to the responsible parties to fill it with earth, and if this is not done, the board of health is to do it.[5]

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ditions of a permit in writing from the health department. The said permit shall be granted only upon a certificate from the health office declaring the water of the well in question to be free from noxious substances or influences and that it is suitable for human food and drink."

[1] New York, Sanitary Code (1899), Sec. 62.

[2] New Orleans, Ordinance No. 127, Council Series, 13 February, 1883, Sec. 4.

[3] St. Louis, Ordinances (1893), Chapter 14, Sec. 453.

[4] St. Louis, Report of Health Commissioner (1895-6), p. 112.

[5] Bridgeport, Ordinances (1892), Chapter 14:

"SEC. 32. That whenever the board of health shall have satisfactory evidence that any well, the water of which is used for domestic purposes, has become pol-

That city wells ought to be abolished, may certainly be affirmed if the teachings of the chemist are to be followed. Thus in Brooklyn in 1884,[1] of 296 wells analyzed, 230 were by the chemical analysis condemned. In Newark[2] of 462 wells, 57.17 per cent. were considered to be contaminated, 27.30 per cent. suspicious, and 15.53 per cent. passable. In Minneapolis[3] of 376 wells from which samples were analyzed, two-thirds were more or less polluted with sewage, and of seventeen wells supplying bakeries, thirteen were reported as utterly unfit for use. The department closed some of the worst wells but was loath to close others as the city water was considered little better, and while improvements were being made in the city supply, the citizens were left free to make their choice. In St. Louis[4] of 101 wells examined, thirty-eight were condemned. The health officer of Syracuse[5] says that chemical examination shows that nearly all wells are unfit for use. The reports for Brooklyn and Newark above referred to, give the details of the analysis for each well and also other data concerning the well, and similar data may be found in the reports of Baltimore,[6] Milwaukee,[7] Philadelphia,[8] Charleston,[9] and Maine.[10] In Charleston bacteriological examination was made of 171 samples from wells and in one of these typhoid bacilli were found and in one colon bacilli. In Memphis the board of health frequently inspects the wells and cisterns used for domestic supply and frequently condemns the shallow surface wells.

Springs.

There is no essential difference between wells and springs, for both have their origin in the great body of ground water. Springs are less likely to be contaminated than wells for they are less likely to be found

luted and rendered unsafe for potable use, notice to discontinue the use of said polluted water shall be sent to the owner, agent, lessee, or party in charge of said well, and at the discretion of the board the owner, lessee, agent, or party in charge of said well may be ordered in writing to close or fill up said well. If the said order is not complied with within the time therein specified, this section shall be deemed violated, and the board may proceed to cause the said well to be closed or filled up, the owner, agent, lessee, or party in charge paying all expenses therefor."

[1] Brooklyn, Special Report of Commissioner of Health, on Pump Wells.

[2] Newark, Report of Health Department (1894), pp. 70, 92, and 120.

[3] Minneapolis, Report of Department of Health (1897), p. 28.

[4] St. Louis, Report of Health Commissioner (1895–6), p. 112.

[5] Syracuse, Report of Board of Health (1894), p. 24.

[6] Baltimore, Report of Board of Health (1898), pp. 80–88.

[7] Milwaukee, Report of Commissioner of Health for year ending April, 1899, p. 93.

[8] Philadelphia, Report of Bureau of Health, (1898), p. 145.

[9] Charleston, Report of Department of Health (1898).

[10] Maine, Report of State Board of Health (1896–7), p. 47.

in thickly settled regions, for when the land is well occupied, as in cities the ground water is carried away by drains, or used up in wells so that the natural springs are dried up and do not furnish a sanitary problem in many cities. Occasionally, however, springs do exist in cities and sometimes are found to be polluted. Thus in Reading[1] a local outbreak of typhoid in the suburbs threw suspicion on certain springs, and chemical analysis indicated that they were decidedly polluted. In Nashville in 1898[2] four springs and a well which were suspected of contamination were subjected to chemical analysis and condemned, and in one of the springs colon bacilli were afterwards found.

Since the attention of the public has been drawn to the danger in the use of contaminated municipal supplies, there has developed quite a trade in spring waters in a number of cities which have the misfortune to be supplied with dangerous, dirty, or offensive water. Spring waters are colorless and hard enough to be agreeable, and hence are preferred by consumers, as well as purchased for prudential reasons. It is quite possible, however, that the consumers in purchasing spring waters may be leaning upon a broken reed, for springs may be impure as are wells and rivers; also "spring water" may, by an unscrupulous dealer be drawn from a neighboring sewage polluted well, and even if pure in the spring, it may by handling, be grossly contaminated. Hence some cities have given this subject attention. In Providence[3] in 1893 nearly 2,000 gallons of spring water were sold daily at an average price of six cents per gallon. This water was taken from nineteen springs. All of these were carefully examined and a bacteriological analysis was made of their waters. The results of the examinations and also of the chemical analyses which had been made by reliable chemists, was favorable in all but four springs. The position of these four showed that they were liable to contamination, and one of them came to the surface immediately beneath one of the trunk sewers recently constructed. The publication of the results of the investigation effectually stopped the sale of water from the suspicious springs. A similar investigation of springs in Massachusetts was made by the state board of health in 1891.[4]

Ice.

It was at one time supposed that the freezing of water purified it, and so it does to a slight extent under certain conditions; but the researches of Prudden Sedgwick Park[5] have shown that it will not kill pathogenic

[1] Reading, Report of Board of Health (1890), pp. 9–13.

Nashville, Report of Board of Health (1898), p. 6.

[3] Providence, Report of Superintendent of Health (1893), p. 37.

[4] Massachusetts, Report of State Board of Health (1891), p. 353.

[5] Boston Journal of Medical Sciences, Vol. 8, p. 213.

bacteria even if they be exposed to severe cold for a long period. These investigations have caused health officials to give increased attention to ice supplies, and at present quite a number of states and cities inspect ice, or the sources from which it is obtained, or control its cutting and sale. While it cannot be denied that it is possible for disease to be caused by the ingestion of ice containing typhoid germs or other pathogenic organisms, or perhaps even when it contains unorganized poisonous substances, it is nevertheless true that very few, if any, outbreaks of disease have ever been traced to the use of ice.

Statutory legislation looking to the prevention of the sale of impure ice has been enacted in several states. In Massachusetts cities may make regulations in regard to ice.[1]

In New Jersey, cities of the first class are given authority to make ordinances in regard to ice. The Wisconsin law forbids the sale for domestic, culinary or drinking purposes, of ice containing mud, decayed vegetation or animal matter, foreign matter or malarial substance. Dealers shall have a sign upon their wagons showing where the ice is cut or made, and if it is sold for cooking purposes only, that fact must be stated on the sign. In Cleveland a similar provision is found in the ordinance, and it is required that the letters shall be six inches high. Massachusetts also has a law which authorizes the state board of health on petition of twenty-five consumers of ice to investigate the supply and make orders concerning the same. In New Hampshire local boards of health may inspect the sources of their ice supplies, and if they deem the ice impure may order the sale stopped. In New Jersey no ice can be cut within a city or town for use in such city, borough or township without a permit from the local board of health, and no ice can be sold without such a permit. The board of health may revoke permits and forbid the sale of ice when in their judgment its use would be detrimental to the public health. The penalty for disobedience of the orders of the board of health or of the statute is punishable by a fine of $500 or six months' imprisonment or both. The Illinois act of 1899 forbids the sale of ice made from water below the standard prescribed by the state board of health.

The New Jersey law forbids the malicious pollution of ice, and in New Hampshire the act of 1895 concerning the pollution of water supplies applies to water from which ice is cut.

Although, as is thus shown, only a few states have authorized any

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[1] Massachusetts, Chapter 338 of 1895:

"Cities may make ordinances to secure the inspection of ice sold within their limits and to prevent the sale of impure ice, and they may establish penalties for the violation of such ordinances, not exceeding twenty dollars for each offence."

action concerning ice, on the part of cities or boards of health, yet a number of cities outside of those states have thus acted. Among cities which have made rules in regard to their ice supplies may be mentioned Albany, Baltimore, Bridgeport, Brookline, Mass., Buffalo, Cambridge, Chicago, Cleveland, Denver, Detroit, Elmira, N. Y., Meadville, Pa., Milwaukee, Minneapolis, North Adams, Mass., Paterson, Rochester, Salt Lake City, St. Louis, and Syracuse. In some of the cities, as Albany, the only rule is one which simply prohibits the sale of impure ice. Other cities forbid the harvesting and importation of ice as well as its sale:

"No person shall bring, store, sell, deliver or distribute, or cause to be brought, stored, sold, delivered or distributed, within the limits of the City of Minneapolis, any ice for domestic use or cooling purposes within said city which shall have been formed or produced by the freezing of unwholesome, impure or contaminated water, or water the use of which would be deleterious to health. And no person shall, within or without the limits of the City of Minneapolis, cut, harvest, or in any way obtain any ice intended for domestic use or cooling purposes within said city, in or from any river, stream, lake or other body of water, the waters of which are unwholesome, impure or contaminated, or the use of which would be deleterious to health."[1]

Still more elaborate rules are those of Chicago[2] and Cleveland,[3] though in the latter city little attempt is made to enforce them. The Chicago ordinance provides for the issuing of licenses, defines what is meant by domestic use and what is meant by impure ice, forbids the taking of ice from certain localities, requires the inspection of vehicles and the places where ice is stored, and authorizes the commissioner of health to make rules for storing, delivery and inspection. Cleveland also attempts to define what is meant by impure ice. The following is from Cleveland, where ice may be condemned and seized if it

"Be found to contain any nitrogen as nitrites, or any pathogenic bacteria, or more than five-tenths (0.5) parts nitrogen as nitrates in one million, or more than two parts of chlorine in one million, or more than five-tenths parts albuminoid ammonia in one million, or over one hundred colonies bacteria in one cubic centimeter, or any colonies of bacteria of the gas producing kind, and the loss on ignition at a red heat must be less than one-half the total solids. In ice which has been stored or packed no account shall be taken of the ammonia or nitrates."

Usually it is only attempted to control the sale of ice when it is to be used in such a manner as to enter into the food or drink of man. Thus we find in the Albany rule the limiting terms "in connection with drinking water, liquids or foods." Other regulations forbid its use for "drinking water or beverages," "for drinking or eating," "or in any way for human consumption." In Chicago impure ice must not be sold

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[1] Minneapolis, Ordinance of 2[illegible] December, 18[illegible], Sec. [illegible]

[2] Chicago, Ordinance of 2[illegible] May, 18[illegible]

[3] Cleveland, Ordinances, 18[illegible], Chapter [illegible], Secs. [illegible]

"from house to house or to hotels, restaurants, saloons or other places where such ice may be used in contact with food or drink," but such ice may be sold for certain purposes as shown below.[1]

Another useful method of dealing with the sale of ice is to require permits as in New Jersey, or the registration of the dealers as in some Massachusetts cities. Other cities outside of these states, as Baltimore, Chicago, Cleveland, Denver, St. Louis, Minneapolis, and Salt Lake City, require dealers to take out permits and refuse to grant them if the source from which the ice is obtained is not satisfactory; but in Cleveland, Denver, and St. Louis a permit is only required for the cutting or sale of impure ice for cooling purposes or of ice from certain localities. In St. Louis and Denver the licensee is obliged to give a bond, in the former city in the sum of $2,000.

The method employed in Cambridge, Mass., is shown by the rules given below.[2] Whether or not there are regulations governing the ice

[1] Chicago, Ordinance 25 May 1896:

"SEC. 5. This ordinance shall not be construed to prohibit the selling or delivering of impure ice to be used only for packing or cooling purposes, that is to say, for use in refrigerators, refrigerator cars, freezing machines, rooms and other places where it will not come in contact with articles of food or drink; provided, that a permit be first obtained from the commissioner of health to sell, deliver, or use impure ice for the purposes aforesaid and for no other purpose.

"Whenever any impure ice for packing or cooling purposes shall be sold or delivered from any wagon or other vehicle the driver or other person in charge thereof shall carry a supply of printed cards, on which shall be printed in large legible letters the words; "Ice for Packing and Cooling Purposes Only. Not for Domestic Use," and he shall hand with each delivery of such ice one such card to each customer thereof, or to the person who receives the same, and shall take at the same time a receipt, which shall be given him by such purchaser or recipient, on which receipt the said words shall be similarly printed. No ice for packing or cooling purposes shall be sold or delivered in the City of Chicago by any person, firm or corporation without such permit, or otherwise than in conformity with the provisions of this section."

[2] Cambridge, Ordinance, 29 December, 1897:

"SECTION 1. Every person, firm or corporation before selling or delivering ice in this city after the first day of February, A. D. 1898, shall prior to such sale or delivery register at the office of the board of health the name and location of the body or bodies of water from which said ice so to be sold or delivered has been cut, or from which the water has been taken for its manufacture. Such registration shall be subscribed and sworn to by the person so proposing to sell or cause to be delivered said ice, or in the case of a firm, by one of the members of the firm, or in the case of a corporation, by the president, general manager, or one of the board of directors of the corporation.

"SEC. 2. Every person, firm or corporation who sells, delivers or causes to be delivered ice in this city after the first day of February, A. D. 1898, shall permit the board of health and its inspectors at all reasonable times to have access to and freely examine the ice intended for such sale or delivery, and shall permit samples to be taken by said board or its inspectors for the purpose of analysis.

"SEC. 3. The board of health shall investigate the sources of supply of ice so

supply, or whether or not permits for dealers are required, an inspection of the source of supply and examination of the ice may be carried on with advantage, and even in the absence of all legislation, the publishing in reports or otherwise of the results of such examinations may accomplish much in improving the supply. Among cities which report examination of their ice supply and its source may be mentioned Baltimore,[1] Boston,[2] Brookline, Mass.,[3] Cambridge, Chicago,[4] Cleveland,[5] Providence,[6] and Salt Lake City.[7] The examination consists in most cases of an inspection of the pond, lake or river from which the ice is cut and perhaps an inspection of more or less of the drainage area from which the water is derived. Samples of ice are also analyzed both chemically and bacteriologically. The water from the melted ice is, of course, examined in these tests as is ordinary water, but certain precautions should be taken in securing the sample of ice and melting the same, to insure a fair sample and protection from accidental contamination.

SEWERS.

This subject will not here receive much attention, for the building and construction of sewers is almost always in charge of engineers and public works officials. The problems of sewer construction are engineering problems, and if a city employs skilled engineers the health officer need not worry about the sewers. Even the need for sewers has scarcely to be urged by health officers. The public so well appreciates their advantages that they are usually demanded when needed, even if they must be entirely paid for by the abutters. Sometimes the health officer may be of service in hastening the action of a dilatory council. In Boston[8] the board of aldermen, when the board of health so requests

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sold or delivered and cause inspection and analysis to be made of the ice from said sources. And if upon such investigation, inspection and analysis and upon hearing, it shall deem and adjudge ice derived from any source to be impure and injurious to the public health, it may prohibit the sale or delivery in this city of such ice or of any other ice which has been intermingled with ice from such source. Notice of such prohibition shall be given in the manner provided by law for giving notice of violations of the board of health, and such notice shall be deemed legal notice to persons."

[1] Baltimore, Report of Department of Health (1898), p. 72.
[2] Boston, Report of Board of Health (1899), p. 87.
[3] Massachusetts, Report of State Board of Health (1896), p. 873.
[4] Chicago, Report of Department of Health (1895–6), p. 215.
[5] Cleveland, Report of Health Officer (1896), p. 36; (1897), p. 47.
[6] Providence, Report of Superintendent of Health (1889), p. 48.
[7] Salt Lake City, Report of Board of Health (1897), p. 61; (1898), p. 67.
[8] Statutes, Chap. 450 of 1889, Sec. 2.

and states that the public health requires it, must provide sewers, but the amount to be so expended in any one year shall not exceed $10,000. In only a few cities is the work of sewer construction undertaken by the health department. The most conspicuous examples are Augusta, Ga., and Memphis. In St. Louis in 1893 over one-fifth of the appropriation of the health department was used to construct shallow temporary sewers to relieve the sewage ditches in certain parts of the city.

Ordinances and rules in regard to the construction and maintenance of sewers are occasionally found, and they are sometimes in the sanitary codes, but they usually date back to the time when sewers or drains were constructed by private enterprise. In recent times, since sewers have been constructed by the municipality and with engineering advice, details have been wisely left to the engineers. While local boards of health rarely advise in regard to sewer construction, it is otherwise with the state board of health. In Massachusetts[1] all municipalities applying to the legislature for authority to construct sewers, must apply to the state board of health for advice. A similar provision that the state board is to be consulted, is also found in North Carolina.[2] A number of the state boards frequently advise on this subject, especially for the smaller cities and villages. Notable among such are those of Massachusetts, New York, and Ohio.

Rules to prevent putting improper substances into sewers are of course not infrequently found in municipal ordinances and codes. Among the concise and comprehensive rules of this kind are those found in the District of Columbia, but such rules had perhaps better be suggested by the engineer rather than the health officer:

"No person shall throw, cast, lay, deposit, drop, or leave in or upon any public sewer in the District of Columbia, or any trap, basin, inlet, grating, manhole, or other appurtenances of any public sewer, any sticks, stones, brick, earth, gravel, dirt, mud, hay, straw, manure, rubbish, litter, sweepings, offal, vegetables, garbage, trees, shrubs, branches, twigs, leaves, papers, cinders, or refuse matter of any kind: *Provided*, That the provisions of this paragraph shall not apply to matter discharged through a house sewer into a public sewer."[3]

River Pollution.

The pollution of public water supplies and their purification have been here considered because of the direct bearing of the subject upon public health. The pollution with sewage, manufacturers' wastes, and other offensive substances of rivers and public waters which are not

[1] Massachusetts, Chapter 375 of 1888, Sec. 3.

[2] North Carolina, Act of 1 March, 1893, Sec. 19.

[3] District of Columbia, Police Regulations (1898), Art. 7.

used for drinking purposes does not affect the health in a direct manner, and indeed the effect on health of such nuisances is not well understood, and has in the past probably been overestimated. Excessive pollution does, however, constitute a nuisance, often a very grievous one, and health officers are always expected to be greatly interested in all efforts for its abatement. That they are thus interested is shown by their reports, for a perusal of those of Augusta, Ga., Baltimore, Boston, Bridgeport, Cambridge, Chicago, Cincinnati, Denver, Detroit, Fitchburg, Hartford, Milwaukee, Paterson, Providence and Salem, shows that the health department frequently calls attention to the offense caused by polluted waters and the necessity for taking some action to remedy it. When the pollution is within the municipal limits and is caused by private parties, and especially if the amount of pollution by any one party is not very great, the health department is quite likely to take action under the nuisance laws, and order the nuisance abated. In this way privies are removed from over streams, drains are cut off, and the dumping of offensive matter is stopped. More rarely is action brought for the violation of some ordinance or statute. But when the pollution is considerable in amount, and affects a large body of water, and when it is due to the discharge of municipal sewage or wastes from large manufactories, and especially when the pollution takes place outside of the limits of the municipality affected, the local board of health has little power to act. It is in these cases that the state authorities can perform useful functions, and the investigations made, and work done by the state board of health in Connecticut, Massachusetts, Minnesota, New Jersey, New York, Ohio, and Rhode Island are well known.

There is a good deal of statutory legislation to prevent the pollution of waters that are used as the sources of domestic supply, but there is not very much that is of use in protecting other waters from offensive pollution. A number of states, as Arkansas, Connecticut, Georgia, Illinois, Iowa, Kentucky, Michigan, Ohio, and West Virginia, forbid the deposit of dead animals in streams or public waters. Some of the laws, particularly those of West Virginia, California, and Ohio, forbid the discharge of many offensive materials into public waters, and included among them are several forms of manufacturers' refuse, as wastes from gas works, oil refineries, and cheese factories. The Ohio statutes also impose a penalty for "whoever renders impure any water course, stream, or water."

A large number of cities have adopted rules forbidding pollution of public waters by the deposit of filth, night soil, offal, dead animals, etc. Most of these have been adopted to meet some local condition and to prevent some special pollution occurring within the city limits. One

of the most general and comprehensive of these laws is that of the City of New York.[1]

These local regulations are generally adopted under the general grant of sanitary powers, but in Illinois and Michigan, cities and villages are especially authorized to make rules for the protection of their public waters.

A consideration of the existing legislation in regard to river pollution reveals the fact that in this country there has as yet been none which can be of much value in preventing any serious pollution. Such pollution is almost always due to the discharge of sewage and manufacturers' wastes, and it may well be believed that a statute must be most carefully drawn to make it possible to bring a criminal action with any degree of success. Most of the efforts to prevent river pollution by legal means have been made by manufacturers and have been by suits at common law, and occasionally municipalities have proceeded, and been proceeded against under the same common law.

Some of the statutes relating to state boards of health, as those of Massachusetts, New Jersey, and New York, provide for the prevention of future pollution by requiring the approval of the board for all projects of sewerage and sewage disposal.

The chief sources of water pollution are municipal sewage and manufacturers' wastes. In the case of the latter, if the manufactories are situated within reach of the city sewers the usual method is to require them to discharge into such sewers, and then if necessary the whole volume of sewage is treated together. Sometimes it is advisable in the cases of certain wastes that would injure or clog the sewers, and in other cases when sewers are not available, it is necessary to compel the manufacturers to purify their wastes. This cannot usually be accomplished by a simple order of the board of health, for manufacturers who have establishments large enough to make a serious nuisance of this kind usually have money enough to make a strong legal fight, and a legal fight of such importance is not usually entered into unless ordered by the council. If manufacturers are to purify their wastes, they must in general follow much the same plans that cities do in the proper disposal of their sewage. Therefore the prevention of water

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[1] New York, Sanitary Code (1899):

"SEC. 196. That no person, persons, company or corporation shall cause, permit or allow any sewage, drainage, factory refuse or any foul or offensive liquid or other material to flow, leak, escape or be emptied or discharged into the waters of any river, stream, canal, harbor, bay, or estuary, or into the sea within the city limits, excepting under low-water mark, and in such manner and under such conditions that no nuisance can or shall be caused thereby or as a result thereof."

Intermittent Filtration.

It has been found that if sewage is passed at intervals through properly prepared soil, it will be purified to a greater or lesser degree, depending upon the care that the process receives. It is necessary, however, that sufficient time should be given between the applications of sewage for air to penetrate the bed. It is only in this way that it is possible to preserve the activity of the bacteria which oxidize the organic matter in the sewage. Very much less area is required than for irrigation, and the operation of the system is less expensive. The study of the principles underlying the purification of sewage by intermittent filtration have been most carefully carried on at the experiment station of the Massachusetts state board of health at Lawrence, and the work there done has placed the practice on a sound basis of fact. This method of purifying sewage is probably more popular in the United States than any other.

Among examples of intermittent filtration are the works at South Framingham, Marlboro, Brockton, and fifteen other towns in Massachusetts, Pawtucket, and Woonsocket, R. I., and at Danbury, and Meriden, Conn.

A modification of intermittent filtration has recently been put in practice at Willow Grove, near Philadelphia. The system was originated by Colonel Waring. The sewage is first run through a strainer which receives about 3,000,000 gallons per acre, and is then run on to a coke filter which is aerated by air driven forcibly through it. It is claimed to care for 800,000 gallons of sewage per day per acre.

At Reading and Atlantic City a unique method of treatment has been applied for a number of years. The filter bed is raised several feet above the ground, and the sewage after filtering through the bed drops in a sort of rain onto the gutters below. By thus passing through the air it is supposed to be oxidized, but it is said to be merely strained in the filter, and deodorized below. This is the so-called West system.

The Septic Tank.

Quite recently a new method of sewage disposal has been much discussed and to some extent, utilized. This is the septic tank in which the sewage is allowed to rest, and be subjected to the oxidizing action of microbes. It may be used alone or as an aid to intermittent filtration. One is in operation at Pawtucket, R. I.

Chemical Precipitation.

The application of chemicals to sewage, sometimes lime, but more often salts of aluminum, causes a coagulation of some of the dissolved organic matter which precipitates and carries the suspended matter down with it. After settling, the supernatant clear liquid is allowed to

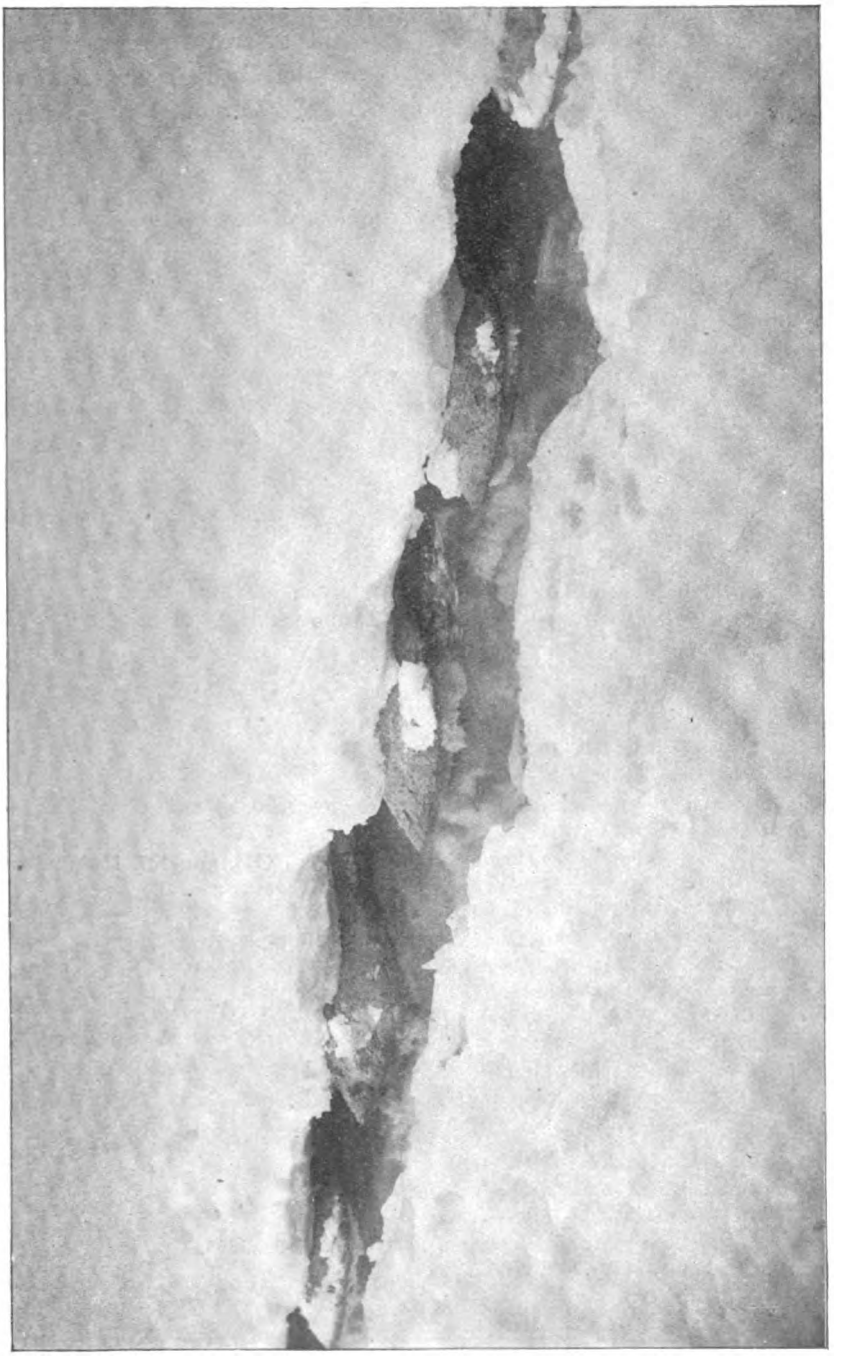

FIG. 15.

Sewage Filter Beds, Pawtucket, R. I., showing the application of Sewage after a heavy fall of snow. (From a plate loaned by the City Engineer, Pawtucket.)

flow away, and the precipitated "sludge" is pumped into presses and pressed into a cake, which may be used as a fertilizer, burned, or used for filling, or transported to sea. This method of treating sewage was adopted at Coney Island, Orange, N. J., the World's Fair Grounds in Chicago, Worcester, Providence, Ilion, N. Y., Mt. Vernon, N. Y., Chautauqua, N. Y.

STATUTES CONSULTED IN THE PREPARATION OF THIS CHAPTER.

WATER.

CALIFORNIA. Criminal Code (1886), Secs. 1357, 1376.
CONNECTICUT. General Statutes (1888), Secs. 2652–5.
Chapters 28 and 203 of 1895.
DELAWARE. Revised Code (1893), p. 926, (Delaware Laws, Vol. 12, Chapter 405.)
ILLINOIS. Annotated Statutes (1896), Chapter 38, Secs. 369, (2), (3); Chapter 24, Art. 10, Sec. 2.
INDIANA. Statutes (1897), Secs. 2017, 2195.
IOWA. Code (1897), Sec. 4979.
KANSAS. General Statutes (1897), Chapter 100, Secs. 338–9.
KENTUCKY. Statutes (1894), Sec. 1278.
MAINE. Chapter 82 of 1891.
MARYLAND. Public General Laws (1888), Vol. I., p. 550, Sec. 277.
MASSACHUSETTS. Public Statutes (1882), Chapter 80, Secs. 96–7, 101–2.
Chapter 208, Secs. 7–8.
Chapter 172 of 1884.
Chapter 274 of 1886.
Chapter 160 and 375 of 1888.
MICHIGAN. Compiled Laws (1897), Sec. 11432.
MINNESOTA. Statutes (1894), Secs. 430–1, 6642.
NEW HAMPSHIRE. Public Statutes (1891), Chapter 108, Secs. 13–15.
Act of 28 March, 1895.
NEW JERSEY. General Statutes (1895), p. 1644, Sec. 49, (XII), pp. 1107, 1109, 2215.
NEW YORK. Revised Statutes (1895), p. 2437, Secs. 70–72d.
NORTH CAROLINA. Act of 1 March, 1893, Secs. 18–21.
OHIO. Annotated Statutes (1900), Secs. 409(–26), 6921, 6923, 6925.
OREGON. Annotated Laws (1892), Sec. 198.
TENNESSEE. Code (1896), Sec. 6869.
VIRGINIA. Code (1887), Sec. 3812.
Chapter 460 of 1892.
WEST VIRGINIA. Code (1899), Chapter 150, Sec. 20b and c.

ICE.

ILLINOIS. Act of 24 April, 1899, Sec. 18.
MASSACHUSETTS. Chapter 287 of 1886 and 338 of 1895.
NEW HAMPSHIRE. Acts of 25 March and 28 March, 1895.
NEW JERSEY. Revised Statutes (1895), pp. 1650, Secs. 87–90, 1695.
WISCONSIN. Statutes (1898), Sec. 4607k.

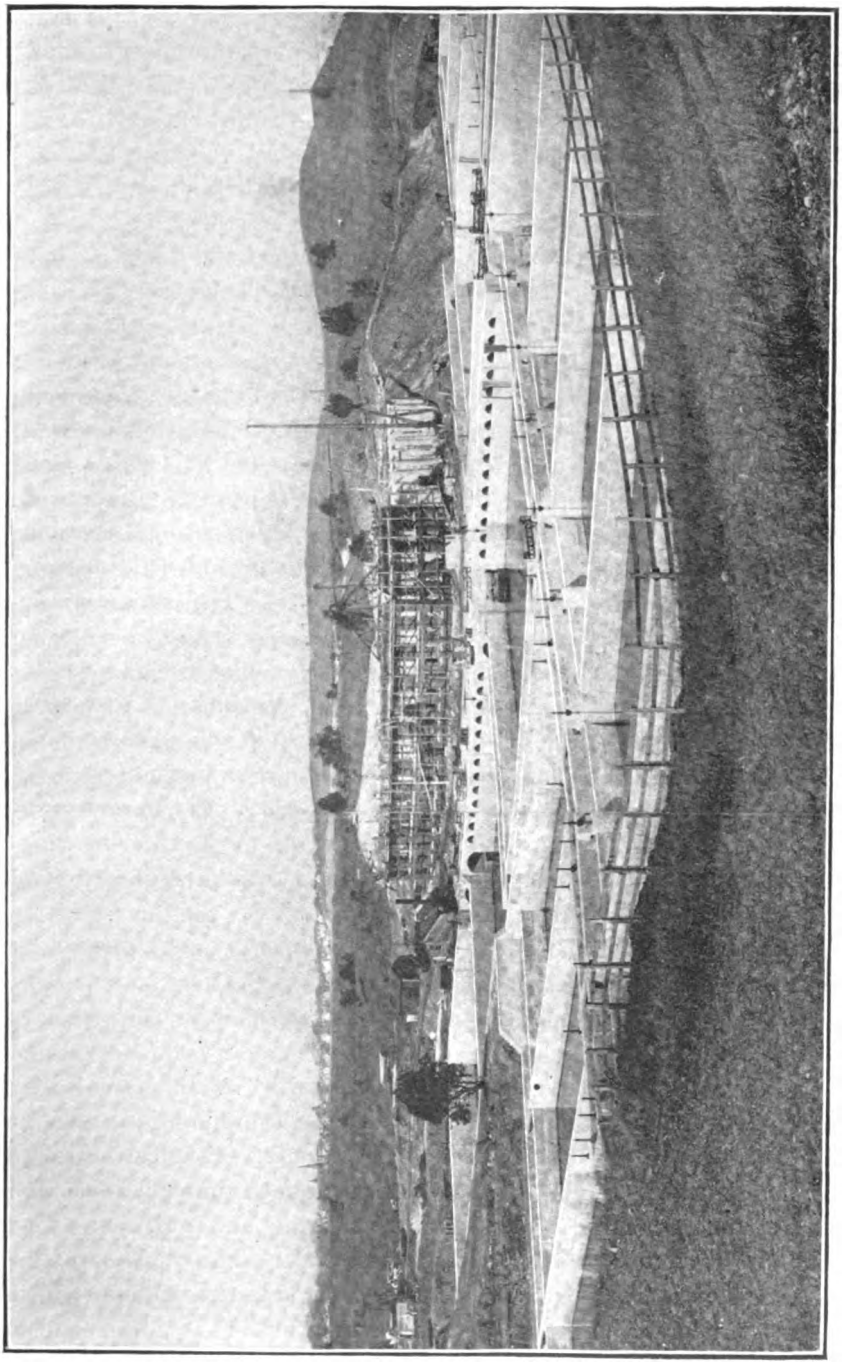

FIG. 16.

Sewage Precipitation Tanks, Providence, R. I. (From a photograph loaned by the City Engineer.)

CHAPTER VII.

FOOD OTHER THAN DAIRY PRODUCTS.

THE consumption of adulterated or decayed food and drink is popularly supposed to be a common cause of ill health, and the prevention of the sale and use of such is considered to be one of the proper sanitary functions of the state. There seems to be abundant evidence that adulterated, infected, and impure milk and milk that is approaching, though it may not have reached the stage of "souring," is most harmful, particularly to young children of whose diet it forms a large part. But with the exception of what has been proved in regard to milk, we do not know so very much about the unwholesome character of food adulteration or the disease producing qualities of food nearing, or even actually undergoing putrefactive changes. The use of poisonous substances, as the salts of lead, arsenic, copper, etc., in coloring matters, or the addition of indigestible substances like "terra alba," or the presence of infectious material capable of transmission to man as trichinæ, are of course recognized as dangerous: but the more common adulterants, like glucose in sugars and molasses, inert substances in the spices and condiments, chickory in coffee, the use of the cheaper fats, like cottonseed oil and tallow in lard and butter, or of water in wines and liquors, probably have little or no injurious effect upon health, and perhaps may even sometimes be an advantage. So, too, in regard to stale and partially decayed food, we are as yet very much in the dark as to what is and what is not really unwholesome. There is, it is true, plenty of evidence of the occasional formation of poisonous ptömaines or similar substances in putrefying food, and it is a very common notion among physicians that the "summer complaints," as they are called, are due to the eating of more or less stale food containing pathogenic bacteria or other organisms. Yet we are after all very uncertain as to the exact conditions necessary to render stale food unwholesome, and we know that large quantities of stale fermenting and putrefying food are eaten with impunity, and often by preference. The question of the harmfulness of eating the flesh of immature or diseased animals is also not fully answered. In making these observations it is not meant to deny the importance of the subject, for it is a very important one, but the writer would urge its further study and meanwhile the exercise

of great care in asserting the harmfulness of any particular food substance.

In the light of our present knowledge it appears that the condition of food sold, with a few important exceptions, is an economic rather than a sanitary affair. Nevertheless, there are reasons why the control of food supplies should be in the hands of the sanitary authority. While many, perhaps most adulterants are harmless, some are certainly not so, and that reason and the fact that at present we cannot always draw a sharp line between the harmless and harmful would logically vest their control with the health department. This department is more often perhaps than any other, able to deal with scientific problems, and the analysis and examination of food present such problems. A municipal laboratory is probably best administered by the sanitary department. In the sphere of state action the board of health is often well equipped for this work, though the department of agriculture, state experiment station, or state university, where such are established, may be the best agents for such investigations. A disadvantage of having the control of foods in the hands of the local health authorities is that on that account, both by them and by the public the sanitary phase of the work is made unduly prominent, whereas its economic bearings are really the most important. What has been said of food in general does not apply to milk. The chemical and bacteriological purity of milk is of prime sanitary importance, and its control has in practice hitherto almost always proved best in the hands of the local board of health. The consideration of milk will be deferred to the succeeding chapter, and we will now occupy ourselves with the consideration of the adulterations and other possibly unwholesome conditions of other food substances.

There are great differences in food laws and in their administration. The control of food substances as regards both legislation and execution is sometimes national, sometimes state, and sometimes municipal. The federal government, by virtue of its authority to control interstate and foreign commerce, has legislated concerning the wholesomeness and purity of food supplies and has a large force of inspectors constantly at work. The chief field covered by the federal officers is the inspection of cattle intended for slaughter, and also of the various products sent out from the slaughter-houses.

Much of the legislation, especially that concerning adulterations, is state legislation, and the execution of these laws is vested in state officers. The execution of milk laws is more often in the hands of local boards of health. As regards the use of food from diseased animals state laws are common and state inspection also. Local regulations are

of course found on all of these subjects, but the special field of local legislation is the control of the sale of foods which are undergoing putrefactive changes. Putrefaction in this connection of course is not confined to its popular use, but embraces any of those degenerative changes which are produced by the action of saprophytic organisms, though the material may not have become actually rotten. The inspection of food to determine whether it is fresh enough for use, and the seizure of such that has passed the limit, is usually the function of the local board of health, and the rules regulating this are local rules.

Unwholesome Food.

Some of the earliest legislation in regard to food was of a very general character, and similar laws are to-day found on the statute books of most of the states. In 1784 Massachusetts[1] enacted the following:

"If any person shall sell any such diseased, corrupted, contagious, or unwholesome provisions, whether for meat or drink, knowing the same without making it known to the buyer. . . ."

The law as modified by subsequent amendments now stands on the statute books as follows:

"Whoever knowingly sells any kind of diseased, corrupted, or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, shall be punished by imprisonment in the jail not exceeding six months, or by fine not exceeding two hundred dollars."[2]

This has been copied verbatim by at least ten states, Colorado, Iowa, Kansas, Maine, Michigan, Oregon, South Dakota, Virginia, West Virginia, and Wisconsin, and in Ohio, Oklahoma, and by Rhode Island with the addition of the word adulterated. It also appears in the local legislation of several cities.

California, Montana, and South Dakota have the provisions shown below.[3]

A number of other states and cities have laws which while the exact phraseology of the Massachusetts statute is not adopted, yet attempt to cover the same ground in the same general way. These laws are sometimes a little more explicit as to what are the "provisions," the

[1] Massachusetts, Chapter 50 of 1784.

[2] Massachusetts, Public Statutes (1882), Chapter 208, Sec. 1.

[3] California, Penal Code (1886), Sec. 383:

"Every person who knowingly sells, or keeps, or offers for sale, or otherwise disposes of any article of food, drink, drug or medicine, knowing that the same has become tainted, decayed, spoiled, or otherwise unwholesome or unfit to be eaten or drunk, with intent to permit the same to be eaten or drunk, is guilty of a misdemeanor."

sale of which is to be regulated. Thus in Maryland[1] it is "unwholesome provisions such as poultry, game, flesh or preparation of flesh, fruits, vegetables, bread, flour, meal, milk or other things intended to be used for human food." Fish and eggs are included in many laws, and sometimes nuts.

The conditions that render the provisions unwholesome are also specified to some extent. Thus in Ohio and Rhode Island the word adulterated is added to the law. In Louisiana food must not be "tainted" or "in a condition of decomposition or unfit for food." Stale, impure, putrid, sour, slimy, diseased, unhealthy, emaciated, unsound, from animals that have died or are too young, not being fresh or properly preserved, are expressions frequently used.

The following rule, or one substantially like it, is found in Buffalo, Bridgeport, Cincinnati, Cleveland, Memphis, Newark, New York, and Rochester:

"That no cased, blown, plaited, raised, stuffed, putrid, impure or unhealthy or unwholesome meat or fish, bird or fowl shall be held, bought or sold or offered for sale for human food, or held or kept in any market, public or private, or any public place in said city."[2]

Besides the regulations which have just been considered and which are of a rather general character, there are numerous rules found mostly in municipal codes which are intended to apply to special conditions or particular kinds of food.

Diseased Food.

Food from animals which are diseased at the time of killing is assumed to be unwholesome. In many instances this is without doubt the case. The flesh from animals suffering from trichinosis is quite likely to produce the disease if eaten without thorough cooking, and the meat of tuberculous animals and those afflicted with actinimycosis is often dangerously infected. Other diseases we know less about, but it is perhaps a not unreasonable safeguard to require that no material from diseased animals shall be offered as food. When, as is so common in general laws on this subject, the sale of "diseased" provisions is forbidden, it may be assumed that food from diseased animals is meant. Sometimes, however, this meaning is made clear in the law. Thus in Louisiana[3] it is enacted "That it shall be unlawful for any person or persons to slaughter for food and offer for sale any cattle, hogs or sheep the same being in an unhealthy condition." A similar provision

[1] Maryland, Chapter 604 of 1890, Sec. 52.

[2] New York City Sanitary Code (1899), Sec. 36.

[3] Louisiana, Act of 3 March, 1880, Sec. 3.

is found in Indiana, Kentucky, Maine, Missouri, Nebraska and Pennsylvania cities of the second class.[1] In St. Louis:[2]

"Any person . . . who shall sell . . . meats from any cattle, hogs, sheep or calves that were unsound, sick or diseased or out of condition at the time they were slaughtered shall be guilty of a misdemeanor . . ."

In Iowa it is unlawful to buy, sell or give away diseased swine.[3] In Minnesota[4] it is unlawful to use any part of a diseased animal for the preparation of food and its use for other purposes must be licensed by the state board of health.

It is usually in these rules provided that all sickly animals shall be reported to the board of health. Much of the legislation concerning contagious diseases of animals has reference to the prevention of the use for food and the proper disposition of all animals suffering from these diseases. Then again the Federal inspection of animals is intended to prevent the slaughter for food of all diseased animals so that much, perhaps most, of the control of "diseased" food depends upon other means than food laws proper.

Food from Over-heated and Feverish Animals.

Animals become feverish from driving or transportation, and many cities forbid their being slaughtered under such conditions. Such a regulation is found in Atlanta, Bridgeport, Chicago, Elmira, Memphis, the City of New York, Yonkers, and other cities, and in Paterson it is added that they shall not be slaughtered until twenty-four hours after unloading. The New Orleans ordinance forbids the use of food from animals "run down by dogs."

Wounded Animals Not to be Used for Food.

Indiana and a number of cities, as Atlanta, New Orleans, and Pennsylvania cities of the second class, forbid the use of maimed or wounded animals as food. The following is the regulation in Atlanta and is very specific in many other respects as well as in regard to wounded animals:

"That no animals or fish that died by disease or accident, no carcass of any calf, pig or lamb, which, at the time of being killed was less than six weeks old, and no meat therefrom, nor any animal, nor meat therefrom, killed while feverish, bruised, disabled, injured with broken limbs, or otherwise; heavy with young, jaded or fatigued from long driving or shipping, shall be used as food."[5]

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[1] Pennsylvania, Chapter 258 of 1895, Sec. 13.

[2] St. Louis, Ordinances (1893), Chapter 14, Sec. 359.

[3] Iowa, Chapter 113 of 1898.

[4] Minnesota, Chapter 175 of 1899.

[5] Atlanta, Regulations of Board of Health, Sec. 101.

Pregnant Animals Not to be Used for Food.

In Atlanta, as above, and also in Cincinnati, it is forbidden to use the flesh of pregnant animals for food.

Food from Emaciated Animals.

In Bridgeport, Chicago, New York, and Pennsylvania cities of the second class, it is forbidden to slaughter or use the food from "meagre" or "emaciated" or "famished" animals.

Food from Dead Animals.

It is very common to forbid the sale of meat of animals that have died, either from disease or accident. Such a regulation is found in Albany, Atlanta, Augusta, Ga., Camden, Chicago, Minneapolis, Newburgh, New Orleans, New York, Paterson, Utica, and Yonkers. The following are the words of the New Orleans ordinance:[1]

"No person shall sell . . . the flesh of any animal which died from disease, accident, or casualty or other means than the usual manner of slaughtering animals for food."

In Chicago[2] it is forbidden to carry the carcass of a dead animal within the precints of any slaughter house in the city; and in Buffalo[3] it is the duty of the cattle inspector that

"He shall immediately notify the owner, agent or consignee of any dead cattle, hogs, sheep or lambs that may arrive in the city of Buffalo, to take the same to some bone yard within one hour after the train upon which they arrive is unloaded. In case any such owner, agent or consignee shall refuse or neglect to so take the same within the time herein prescribed, it shall be the duty of the inspector, and he shall have power, to forthwith remove the same to some bone-yard and dispose of the same to the best advantage."

Animals must be Bled, Cleaned, and Cooled.

All large animals must be so treated before they can be offered for sale according to the rules of Chicago, Denver, Memphis, Minneapolis, Omaha, and New York. The following is the rule in New York and has been copied very generally by the other cities mentioned:

"That no meat or dead animal above the size of a rabbit shall be taken to any public or private market for food, until the same shall have fully cooled after killing, nor until the entrails, heads, and feet (except of poultry and game, and except the head and feet of swine) shall have been removed."[4]

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[1] New Orleans, Ordinance No. 4155, C. S., as amended by Ordinance 4274, 5917, and 6691, Sec. 13.

[2] Chicago, Ordinance of 4 January, 1897, Sec. 4.

[3] Buffalo, Ordinances (1897), Chapter 25, Sec. 103.

[4] New York, Sanitary Code (1899), Sec. 47.

Sale of Undrawn Poultry.

The question as to whether poultry should be sold without having the viscera removed has been much discussed. If the entrails remain the odors and taste from the offensive matter in the gut are absorbed by the surrounding tissues which are therefore more or less disagreeable to the consumer. On the other hand it is claimed by the dealers, decomposition of the muscular tissue takes place sooner when the viscera are removed. The consumer then would naturally prefer that the poultry be promptly drawn, while the dealers prefer that they should not be, as they thus keep longer in a saleable condition. The Massachusetts law requires that they shall be drawn, but in Boston at least it is a dead letter.[1] In Minnesota[2] plucked poultry, and game, and rabbits must be drawn. A similar rule is found in Cincinnati, Buffalo, and Erie. In Detroit the crops of poultry must be removed before they are sold.

Blown Veal and Mutton.

The practice of blowing carcasses i. e., injecting air under the superficial fascia, is resorted to to a considerable extent in order that the meat shall present a better appearance, as the air in the tissues makes it look like fat. It is a reprehensible practice as it is in the nature of a fraud, and furthermore it is not desirable to have saliva from a butcher injected into the animal through a dirty pipe stem; an accident which doubtless sometimes occurs. Hence in a number of cities mentioned on page 306 the sale of meat so treated is forbidden by a rule there given. It is also the rule in Cleveland, and the superintendent of markets is directed to see that it is strictly enforced. In New Orleans[3] it is provided that the carcasses shall only be blown by means of a bellows and that no animals over fifteen months of age shall be blown at all. The practice in that city is to ship calves to market blown and with the hides on. They present a bloated and disgusting appearance and the inspector in that city is decidedly of the opinion that blowing should be forbidden. It is the opinion of the inspector that blowing hastens decomposition and it is likely that this is so, as, if bellows are used, the air pumped in must carry many micro-organisms directly into the tissues.

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[1] Massachusetts, Chapter 94 of 1887:

"No poultry, except it be alive, shall be sold or exposed for sale until it has been properly dressed, by the removal of the crop and entrails when containing food."

[2] Minnesota, Chapter 211 of 1895.

[3] New Orleans, Ordinances, No. 421 C. S., adopted 28 August, 1883.

Food from Immature Animals.

It is generally assumed that the flesh of immature animals is neither as wholesome or nutritious as that of adults, and that the flesh of very young animals is often positively injurious. However the facts may be, there is a very general attempt to forbid the sale of such in the United States. General provisions that immature animals shall not be used for food are sometimes found as in Pennsylvania cities of the second class;[1] but usually such regulations are of a specific character and state definitely the age limit of the animals. The animals usually referred to, are calves, pigs, and lambs. There is not very much temptation to send young lambs to market, neither is the demand for young pigs very great. By far the most important traffic in young animals is in calves. Veal is a popular article of food, and it is not considered profitable by dairymen to keep the calves any longer than is necessary. The demand for the milk of the cow leads them to dispose of the calf at the earliest moment. Hence a very large number of young calves are thrown upon the market. To prevent the sale of such immature animals for food, statutes are found in several states and local regulations in many cities.[2] None of the statutes except that of Vermont, refer to any animal other than calves, but nearly all of the local rules including those of cities in the states mentioned include calves, lambs, and pigs. The age limit prescribed for the different animals is in almost all cases for calves, four weeks; for pigs, five weeks; for lambs, eight weeks. The exceptions are two weeks for calves in Portland, Ore., three weeks in Pennsylvania, one month in Buffalo, five weeks in Hartford, and six weeks in Missouri, Atlanta, and Spokane, but according to a statement in "Municipality and County," Vol. 3, page 161, "As a matter of precedent and standard, calves weighing less than forty to sixty pounds and under six weeks, are in Buffalo unconditionally condemned," by the slaughter-house inspectors. In New York the duty of enforcing the law is placed upon the commissioner of agriculture, and it is forbidden to transport veal without a tag. For pigs the time is in Scranton, three weeks; New Orleans, Cincinnati, and Utica, four weeks; and in Atlanta and Spokane, six weeks. In addition to the time limit the ordinance in Rochester requires that a veal shall weigh at least seventy pounds, and in New York City forty-five pounds. In the enforcement

[1] Pennsylvania, Chapter 258 of 1895, Sec. 13.

[2] Indiana, Maine, Massachusetts, Missouri, New York, Ohio, Oregon, Pennsylvania, and Rhode Island all have laws upon this subject, and many cities outside of these states may be mentioned as Atlanta, Bridgeport, Buffalo, Camden, Chicago, Denver, Erie, Hartford, Minneapolis, Newark, New Orleans, Omaha, and Paterson.

of these laws, the question as to whether an individual veal is of the age required is to be settled by the judgment of the inspector or other witnesses. To arrive at a correct conclusion is not always an easy matter, and if a weight limit was fixed by law probably the laws could be better enforced. In some cities the inspectors fix a weight limit which shall be the guide for their judgment as to whether a particular carcass is under age or not.

The best of the state laws is that of Rhode Island: [1]

"Every person who shall kill, or cause to be killed, for the purpose of sale, any calf less than four weeks old, or shall sell, or have in his possession with intent to sell, the flesh of any calf which he knows to have been killed when less than four weeks old, shall be fined not exceeding twenty dollars."

The Maine, Massachusetts, and Ohio laws insert the word knowingly, thus making proof of violation more difficult. This, however, does not apply to the killing, but only to the selling, thus rendering it easier to convict of the former than of the latter offence. The Massachusetts law is, however, superior in this respect, that it provides for inspection and seizure: [2]

"Said inspectors may inspect all veal found in said cities or towns or offered or exposed for sale or kept with intent to sell therein, and if said veal is, in the judgment of the inspector, that of a calf killed under four weeks old, he shall seize the same and cause it to be destroyed or disposed of as provided in the preceding section, subject, however, to the provisions therein contained concerning appeal and the disposal of moneys."

Cleanliness of Markets.

It is highly desirable that markets should be kept in as neat and clean condition as possible. Æsthetic reasons alone are sufficiently weighty to require this; but there are other reasons more imperative. Provisions, especially meat, fish, milk and dairy products, very readily become dirty and are not readily cleaned. They easily become infected. Putrefaction which it is desirable from every point of view to prevent or put off as long as possible is hastened by exposure to filth. Hence regulations have been adopted in many cities to secure greater cleanliness in markets. Below [3] are the rules which have been adopted in Chicago and Atlanta.

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[1] Rhode Island General Statutes (1896), Chapter 282, Sec. 3.

[2] Massachusetts, Public Statutes (1882), Chapter 58, Sec. 3.

[3] Chicago, Ordinances (1881), Sec. 1405:

"That every person being the owner, lessee, or occupant of any room, stall or place where any meat, fish or vegetables designed or held for human food shall be stored or kept, or shall be held or offered for sale, shall put and keep such room, stall and place and its appurtenances in a clean and wholesome condition; and every person having charge, or being interested, or engaged whether as principal or agent, in the care, or in respect to the custody or sale of any meat, fish, birds, fowl or vegetables designed for human food, shall put and preserve the same in a clean and

In New Orleans[1] each market stall must be provided with a covered garbage barrel in which all refuse must be placed and none thrown on the floor; and [2]

"During the half hour immediately after the closing of said market butchers or other persons hiring or occupying their respective stalls, stands and tables shall be bound to scrape, wash and cleanse the same, so as to keep the said stalls, stands and tables in the highest state of cleanliness, and every person neglecting to comply punctually with the terms and conditions of this section, or who shall not quit the said market at the hour specified, shall be subject to the penalties stipulated in section 32 of this ordinance."

In Cincinnati fish must not be cleaned in a market. The following is the rule in Asbury Park[3] in regard to fish markets:

"All portions of the floor, and the side walls to a height of three feet above the floor of every store, market or apartment where fish or shellfish or other substance subject to rapid decay is held for sale or stored shall be constructed of tiling, flagging stone or cement concrete, and be made water tight. All such floors shall be properly graded and drained, and all offal, refuse and unwholesome or offensive matter shall be removed therefrom at least once in every twenty-four hours. and said floors and side walls shall at all times be kept clean and free from offensive odors."

In New York and Chicago it is forbidden to slaughter any animals in a market; and in many other cities, and indeed in these cities, the same end is accomplished by the regulations governing slaughter-houses and slaughtering; but "animal" in this connection is not assumed to include poultry. The killing of poultry in markets is also forbidden in some cities, as Newark[4] and Boston.

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wholesome condition, and shall not allow the same or any part thereof to be poisoned, infected, or rendered unsafe or unwholesome for human food."

Atlanta, Rules and Regulations of Board of Health, Sec. 101:

"No animal shall be . . . killed or kept in same building, or in so close proximity with fumes of gas or diseased or other spoilt meats, or dead carcasses, as to be contaminated therefrom or rendered unwholesome or unhealthy thereby, or hauled in the same vehicle, or manipulated with tools used on diseased or other dead carcasses as aforesaid, or dressed or kept in any building wherein animals, or parts of animals, dead from injury or disease are stored, kept or rendered, or wherein decomposed, putrid or offensive meats of any kind are kept, or within one hundred feet of any building wherein animals dead as aforesaid, or other unsound meats are stored, kept or rendered, or dressed, or kept in any house or upon premises which are not clean and maintained in a pure and wholesome condition by necessary disinfection, flushing, washing, scalding and lime washing, and the removal therefrom of all accumulations of filth and of all decomposing and offensive matter, shall be brought into said city, or in said city sold, held, or offered for sale as food."

[1] New Orleans, Ordinance 4155, C. S., as amended by Ordinances 4724, 5917, 6691, Sec. 16.

[2] New Orleans, Ordinance 4155, C. S., as amended by Ordinances 4724, 5917, 6691, Sec. 24.

[3] Asbury Park, Sanitary Code (1897), Sec. 37.

[4] Newark, Sanitary Code (1888), Sec. 45:

"That no person or persons or corporation shall kill, scald, pick or dress any chicken, turkey, duck, goose or other feathered animal within the limits of any market, public or private, within the City of Newark."

The Hebrew method of killing fowl in houses and small markets is productive of much offence where many of this race congregate. In Boston public killing places for poultry have been established. Licenses are granted for these places and the proprietor then rents coops at a rate approved by the board of health. An elaborate set of rules[1] were adopted for their control and they are frequently inspected, but at the best they are offensive places. In New York also a license is required for killing fowl.

Control of Markets.

A most important means of controlling markets is by the establishment of public markets or market places. In some cases these markets are the property of the city, and in others they are owned by quasi public chartered corporations. In either case the business done by the individuals or firms who occupy them is more easily controlled than it is when separate markets are scattered all over the city. In the case of public markets the superintendent and his subordinates may easily serve as inspectors, and being constantly on the premises their services in this direction are very efficient. In a number of cities they are directly charged with the enforcement of the rules concerning the wholesomeness of the food exhibited. Thus in Cincinnati[2] the superintendent is to seize all unwholesome or otherwise proscribed provisions. A large proportion of the cities of the United States have such public markets. They have been established, however, not so much for sanitary as for economic reasons. In the city of the writer there is no such market, but there has been for years much agitation of the subject and there is a strong desire on the part of many that the city should establish such a market. Both in cities where there is and in those where there is not a public market, there are private markets and peddlers' wagons. In some cities the license system of control is adopted for these, particularly the peddlers' wagons. Among the cities in which markets are licensed may be mentioned Chicago, Denver, and New Orleans. In Denver the application must be approved by the health commissioner and the fire and police boards. In Chicago the fee for a market license is fifteen dollars per annum, in Denver it is fifty dollars.

The licensing of peddlers' carts is more common than the licensing of markets. Sometimes a nominal fee is charged for these licenses on the ground that no burden should be placed upon men of moderate means engaged in a legitimate business. At other times a considerable fee, as twenty-five to fifty dollars is charged, the idea being to obtain a

[1] Boston, Report of Board of Health (1896), p. 96.

[2] Cincinnati, Manual of Department of Health (1898), p. 111.

rental for the use of the streets to do business in. In Denver the license fee for peddlers is four hundred dollars and is doubtless intended to be prohibitive.

By a system of license it is possible to require a properly constructed market or wagon before the license is granted, and strong after-control is exercised by making use of the power to revoke whenever it is found that improper food is sold. It is necessary that rules should be framed to secure the cleanliness of these wagons. The Boston rules are given below.[1]

In Brooklyn it was required that the wagon boxes of fish peddlers be lined with zinc as must the boxes in front of markets.

In New Orleans, no crabs or shrimps shall be sold in any market after ten A. M., or from any cart from 1 May to 1 October.

In Denver and Erie the cleanliness of employes as well as of markets is prescribed.[2]

In Rochester filthy barrels and boxes must not be used for holding food.[3]

The exposure of meat to the dust of the streets is considered dangerous and is forbidden in the City of New York.[4] See also the

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[1] Boston, Ordinances (1890), Chaper 49, Secs. 2 and 88:

"No person shall, at any time, have in his possession with intent to sell, fish of any kind, except flounders, smelts, and other small fish, salmon, and shad, until the same have been cleansed of their entrails and other refuse parts, nor fish of any kind, unless they are kept in covered stalls, or fish-boxes, or in covered carts, which shall be clean and in good order, and well secured from the rays of the sun.

"No hawker or peddler shall carry or convey any articles enumerated in section one of chapter sixty-eight of the Public Statutes in any manner that will tend to injure or annoy the public health or comfort, nor otherwise than in vehicles or receptacles which are neat and clean and do not leak, and have printed on them in letters and figures at least two inches in height the name of the person selling, and the number given him by the Board of Health, and which are approved on the first Monday in every month by the Board of Health."

[2] Erie, Rules of Board of Health, Sec. 2:

"No butcher, or other person in his employ, shall appear for the purpose of cutting, handling or vending meat, unless he shall be neatly dressed in a white frock, or with a white apron and white oversleeves extending above the elbows."

[3] Rochester, Board of Health Ordinances, No. 22, Sec. 1:

"No person or persons, firm or corporation, shall keep or convey flour or any article of human food in barrels, casks, boxes or any receptacle that has become musty or otherwise polluted, under a penalty of ten dollars ($10.00) for each and every offense."

[4] New York Sanitary Code (1899), Sec. 47:

". . . nor shall the body or any part thereof of any animal which is to be used as food be carted or carried through the streets, except it be covered so as to protect it from dust or dirt, and no meat, poultry or game shall be hung or exposed for sale outside of any shop or store in this city or in the open windows or doorways thereof."

Boston rules. A similar rule is found in San Francisco and Portland, Ore., and in Minnesota[1] a statute provides that fresh meat in transit shall be covered to keep off flies. In Colorado Springs fruit must be covered to keep off the dust.[2]

The most common place to find filth in markets is the ice-box, and regulations concerning its care are found in Chicago, New York, Memphis, and Scranton. In Scranton the inspector is required to inspect ice-boxes as often as possible and see that they are kept clean, and this is doubtless the practice of the inspectors of other cities where it is not prescribed. The other cities mentioned above have the following rule:

"That no butcher or dealer shall keep in any market any refrigerator or ice-box, unless the same shall be lined with lead or some proper metalic substance, so as to be water-tight, nor unless the same be provided with a pipe of lead, zinc or copper, leading therefrom to the nearest gutter or proper waste pipe."[3]

Bakeries.

Connecticut, Massachusetts, Minnesota, New Jersey, New York, Ohio, Pennsylvania, and Wisconsin have laws in regard to the construction and management of bakeries, mostly of quite recent passage, and Baltimore by a special act is authorized to inspect bakeries.[4] These laws have, perhaps, aimed as much to improve the sanitary conditions under which the bakers labor as to secure cleaner and better bread. They have received the support, and have perhaps been passed in some cases at the instance of the bakers' unions. The best law appears to be that of Pennsylvania, though it does not differ in essentials from that of other states. The provisions of the act are shown below.[5]

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[1] Minnesota, Chapter 209 of 1895.

[2] Colorado Springs, Ordinances of 18 January, 1894, Sec. 21:

"All fruit intended to be eaten in the form in which it is sold, such as dates, figs, and raisins, shall, when kept or offered for sale, be securely covered with glass or wooden cases so as to protect the same from contact with flies and dust."

New York Sanitary Code (1890), Sec. 58.

[4] Maryland, Chapter 278 of 1896.

[5] Pennsylvania, Act of 27 May, 1897:

"SECTION 2. All buildings or rooms occupied as a biscuit, bread, pretzel, pie or cake bakery, or macaroni establishment, shall be drained and plumbed in the manner directed by the rules and regulations governing the house drainage and plumbing as prescribed by law, and all rooms used for the purpose aforesaid shall be ventilated by means of air shafts, windows or ventilating pipes, so as to insure a free circulation of fresh air. No cellar or basement, not now used for a bakery, shall hereafter be occupied and used as a bakery, unless the proprietor shall have previously complied with the sanitary provisions of this act.

"SECTION 3. Every room used for the manufacture of flour or meal food products shall have an impervious floor constructed of cement or of tiles laid in

In New Jersey, Ohio, and Pennsylvania, the factory inspector is to enforce these laws and may give certificates that the law has been complied with. In Massachusetts the local board of health is to enforce the law. The report of the Brooklyn (N. Y.), health department for 1896 shows that the inspectors found the bakeries in that city in good condition and in the cities of Massachusetts flagrant violations by bakers of sanitary principles are not common. In 1896 Milwaukee passed an ordinance providing that all bakeries and candy manufactories should be kept clean and wholesome. It is reported[1] that some of the bakeries in that city were in bad condition and many of them were so in New Haven[2] and San Francisco.[3]

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cement, or of wood of which all the crevices shall be filled in with putty, and the whole surface treated with oil varnish. The inside walls and ceiling shall be plastered and either be painted with oil paint, three (3) coats, or be lime-washed, or the side walls plastered and wainscoted to the height of six (6) feet from the floor, and painted or oiled; when painted, shall be renewed at least once in every five years and shall be washed with hot water and soap at least once in every three (3) months; when lime-washed the lime-washing shall be renewed at least once in every three (3) months. The furniture and utensils in such room shall be so arranged that the furniture and floor may at all times be kept in a thoroughly sanitary and clean condition. No domestic or pet animal shall be allowed in a room used as a biscuit, bread, pie or cake bakery, or in any room in such bakery where flour or meal products are stored.

"SECTION 4. The manufactured flour and meal food products shall be kept in perfectly dry and airy rooms, so arranged that the floors, shelves and all other places for storing the same can be easily and perfectly cleaned.

"SECTION 5. Every such bakery shall be provided with a proper wash-room and water closet or closets, apart from the bakeroom or rooms where the manufacture of such food products is conducted, and no water closet, earth closet, privy or ash pit shall be within or communicate directly with the bake room of any bakery, hotel or public restaurant.

"SECTION 6. Every sleeping room for persons employed in every bakery shall be kept separate from the room or rooms where flour or meal products are manufactured or stored, and shall be provided with one or more external glazed windows, each of which shall be at least nine (9) superficial feet in area, of which at least four and one-half (4½) superficial feet shall be made to open for ventilation; and such sleeping places when they are on the same floor as the bakery, shall be inspected in order to maintain them in a condition of cleanliness.

"SECTION 7. No employer shall knowingly require, permit or suffer any person to work in his bakeshop who is affected with consumption of the lungs, or with scrofulous diseases, or with any veneral diseases, or with any communicable skin affection, and every employer is hereby required to maintain himself and his employees in a clean condition while engaged in the manufacture, handling or sale of such food products, and it is hereby made the duty of the Board of Health to enforce the provisions of this section."

[1] Milwaukee, Report of Health Commissioner (1896–7), p. 20.

[2] New Haven, Report of Board of Health (1897), p. 29.

[3] San Francisco, Report of Department of Health (1897), p. 195.

In Erie a regulation has been adopted by the board of health requiring that bakers' delivery wagons must be kept clean.[1]

New Orleans has a bakery ordinance and the following is the schedule of items inquired into by the inspectors:

Inspection of Bakery No.....
Owned by.....
Condition of Drainage.....
Condition of Premises and Yards.....
Condition of Privy Vault and Kind.....
Condition of Floor of Bake Shop.....
Condition of Sponge Trough and Moulding Bench.....
Condition of Raising Box.....
Condition of Cushions and Covers.....
Condition of Bread Pans and Moulds.....
Water Supply.....
Hydrant, is it Filtered?.....
Cisterns, number.....Capacity.....
Distance from Cisterns to Privy Vaults.....
Condition of Stable.....
Distance from Stable to Bake Shop.....
Amount of Flour Used per Day.....
Kind of Flour Used.....
Kind of Yeast Used.....
Sickness on Premises.....Acute.....
Chronic.....Infectious.....
General Remarks.....
.....
.....
.....
.....
Inspection Made.....189..
By Officer.....

Hotels and Restaurants.

Those who framed the food laws undoubtedly intended them to apply to markets, peddlers, wholesale provision houses, etc. The sale of provisions however takes place in hotels and restaurants, and the laws might fairly be interpreted to cover such sales; but it has been deemed advisible to make special provisions for this in the rules of Chicago, Denver, District of Columbia, New York City,[2] and Omaha.

[1] Erie, Rules of Board of Health:

"All vehicles from which any biscuit, bread, pretzel or other bakeshop product is sold in the city of Erie shall be kept in a clean and sanitary condition, and all baskets, boxes, or other receptacles in which any of the aforesaid products are conveyed through the streets shall be closely covered in a way and manner that will protect them from any pollution whatsoever."

[2] City of New York, Sanitary Code (1899):

"SEC. 49. That no person, being the manager or keeper of any saloon, boarding-house, or lodging-house, or being employed as clerk, servant, or agent thereat, shall therein or thereat, offer or have, for food or drink, or to be eaten or drank, any poisonous, deleterious, or unwholesome substance, nor allow anything therein to be done or to occur, dangerous to life or prejudicial to health."

A more explicit rule in regard to kitchen cleanliness is found in Colorado Springs.[1]

In Denver the health commissioner is directed to inspect hotels and restaurants at frequent intervals.

Vegetables and Fruit.

Special rules are sometimes found in regard to vegetables and fruit.

"No person shall land on any wharf or other place, or shall bring into the city, any decayed or damaged vegetables or fruits.

"No person shall hold, sell or offer for sale, or bring into the city, any decayed or damaged vegetables or fruit."

"It shall be unlawful for anyone to sell, offer for sale, or have in his possession with intent to sell, any unripe, over-ripe, decayed or unwholesome fruit or vegetables; and the health officer and all officers of the department of health are authorized and directed to immediately confiscate and destroy any such fruit or vegetables when offered for sale." [2]

"No person shall bring into the city, or have in his possession with intent to sell, or sell, any vegetables, excepting green peas or beans in the pods, and green corn in the inner husks, which have not previously been divested of all parts not commonly used for food; and no person shall have such parts in his possession in any market-place, nor in a cart or vehicle used for the sale of vegetables or other articles of food." [3]

In San Francisco[4] fruit and berries must be packed in new, clean boxes. In the report of the board of health of Asbury Park for 1892, opposite page 26, is a photograph showing berry boxes culled out of a garbage dump for subsequent use, so that it would appear that the San Francisco rule is not uncalled for.

Flesh of Unclean Animals.

". . . Nor shall any person sell or expose or offer for sale the flesh of any dog, cat, or any unclean animal." [5]

Metal Soda Fountains.

"In the sale of, or keeping for sale, any beverage or drink, no person shall keep or use any tap, faucet, tank, fountain or vessel, or any pipe or conduit in connection therewith, which shall be composed of or made with brass, lead, copper, or other metal or metallic substances that are or will be affected by liquids so that dangerous, unwholesome or deleterious compounds are formed therein or thereby, or such

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[1] Colorado Springs, Sanitary Code, Sec. 47:

"In the kitchen of restaurants and hotels and in all places where the floor may receive moisture, filth, or decomposed matters the flooring shall be made of water-proof material. No such floor shall have under it spaces which are not readily accessible, and the drainage shall in all cases be sufficient to remove the waste from the building in a manner satisfactory to the health officer."

[2] Cincinnati, Manual of Health Department (1898), p. 98.

[3] Boston, Ordinances (1890), Chapter 49, Sec. 3.

[4] San Francisco, Report of Board of Health (1897), p. 8.

[5] New Orleans, Ordinance No. 4155, Sec. 13.

that beer, soda water, syrups or other liquids, or any beverage, drink or flavoring material drawn therefrom shall be unwholesome, dangerous or detrimental to health."[1]

Fish-Cars near Sewers.

"No fish-car, lobster-car, ark, or other receptacle for fish or lobsters, shall be kept or put within one hundred and fifty feet of the mouth of any sewer."[2]

Much has of late been written about the danger of keeping oysters in sewage polluted waters, but there does not appear to be any legislation on the subject.

Bread.

The earliest food regulation that the writer has found was an act of the Pennsylvania legislature, 18 March, 1775, in regard to bread:

"If any person or persons shall adulterate or mix any improper and unwholesome ingredient in any kind of flour of which bread shall be made as aforesaid, every such person or persons, being thereof legally convicted before any magistrate or justice of the city, borough or county where such bread shall be so made, sold, or exposed to sale, who is hereby authorized and empowered to hear, try and determine the same, shall forfeit and pay the sum of five pounds for every such offence."

An almost identical provision has recently been adopted in New Jersey[3] and a similar law is on the statute books of Kentucky.[4] In the District of Columbia bread must not contain any alum, sulphate of copper, borax, sulphate of zinc, or other poisonous ingredient, and it must not contain more than 31 per cent. of moisture, 2 per cent. of ash, or less than 6.25 per cent. of albuminoids.[5]

Canned Goods.

The danger in the use of canned goods has been much discussed and the likelihood of finding spoiled goods or metallic poisons in the cans is not a remote one. There has not, however, been much legislation on the subject.

Iowa and Michigan have the following:[6]

"It shall hereafter be unlawful in this state for any packer of, or dealer in, hermetically sealed, canned or preserved fruits, vegetables, or other articles of food, to knowingly offer such canned or preserved articles for sale for consumption in this state after October 1, 1886, unless the cans or jars which contain the same shall bear the name, address and place of business of the person, firm or corporation that canned or packed the articles so offered, or the name of the wholesale dealer in the state who sells or offers the same for sale, together in all cases with the name of the

[1] New York, Sanitary Code (1899), Sec. 191.

[2] Newport, Rules of the Board of Health, Sec. 15.

[3] New Jersey, Public Laws (1896), p. 261.

[4] Kentucky, Statutes (1894), Sec. 1273,

[5] Act of Congress of 17 February, 1898, Sec. 3.

[6] Iowa, Code (1897), Secs. 4994–5.

state, city, town or village, where the same were packed, plainly printed thereon, preceded by the words, 'packed at,' such name, address and place of business shall be plainly printed on the label, together with the mark or term indicating clearly the grade or quality of the articles contained therein.

"All packers of, and dealers in soaked goods or goods put up from products dried or cured before canning, shall in addition to complying with provisions of section one of this act, cause to be plainly branded on the face of the label in good, legible type, one-half of an inch in height, and three-eighths of an inch in width, the word 'soaked.'"

There is a similar law in Kentucky, except that in the latter state the name of maker and quality of goods must be stamped on the can. An earlier law, but one not as good as the above, was enacted in Illinois in 1885. Laws have also recently been enacted in Ohio, Massachusetts, and Wisconsin. Maryland formerly had a law of this kind, but it was recently repealed.[1]

Misrepresentation Forbidden.

New York and Memphis have the following:

"That no meat, fish, fruit, vegetables or milk, or unwholesome liquid shall knowingly be bought, sold, held, offered for sale, labeled, or any representation made in respect thereof, under a false name or quality, or as being what the same is not, as respects wholesomeness, soundness, or safety for food or drink."[2]

Such a rule would prevent the sale of shark for halibut as happened in San Francisco,[3] or of cats for rabbits, or horse meat for beef. In New Jersey a recent law allows local boards of health to regulate the sale of horse flesh.

Misbranding.

The selling of one food substance in place of another is forbidden in a number of general food laws. Thus the Massachusetts laws and those copied from it, forbid the sale of food "if it is an imitation of or is sold under the name of another article." The provisions of this law which permit the sale of mixtures or compounds that are so labeled, implies the prohibition of any false label. The laws in regard to milk, lard, butterine, vinegar, wines, etc., also have sections which provide a penalty for marking goods with a false label or failing to mark with a true label. Thus in Michigan:[4]

"Whoever shall falsely brand, mark, stencil, or label an article or product required by this act to be branded, marked, stenciled, or labeled, or shall remove, alter, deface, mutilate, obliterate, imitate, or counterfeit any brand, mark, stencil, or label so required, shall be deemed guilty of a misdemeanor. . . ."

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[1] Maryland, Chapter 448 of 1898.

[2] New York, Sanitary Code (1899), Sec. 51.

[3] San Francisco, Report of Board of Health (1897), p. 7.

[4] Michigan, Compiled Laws (1897), Sec. 5027.

Citizens' Reports.

Most of the regulations which forbid the sale of flesh of diseased animals require that all persons having a knowledge of such diseased animals shall report them to the proper authorities. Also the laws and regulations in regard to contagious disease of animals have the same requirement. The ordinances of Chicago and Minneapolis go farther than this:

"That it shall be the duty of every person knowing of any fish, meat, fowls, birds or vegetables being bought, sold or offered or held for sale as food for human beings, or being in any market public or private in said city, and not being sound, healthy or wholesome for such food, to forthwith report such facts and the particulars relating thereto, to the department of health or to one of its officers or inspectors." [1]

ADULTERATION AND SUBSTITUTION.

Laws in regard to adulteration are found in both federal and state statutes and in municipal ordinances. Of these by far the most important are the state laws. The only federal statute in regard to adulterations forbids the importation of adulterated foods, drugs, or liquors.[2] Some sort of state legislation on the subject of adulteration of food is found in every state and territory except Texas.

In a few of the states, as Rhode Island, the terms of the act are very general and vague, but in most states the laws are sufficiently explicit to make them of value in dealing with this subject. Besides such laws, which are designed to cover adulterations in general, there are many special provisions and separate acts relating to special materials, as milk, butter, drugs, vinegar, molasses, etc., which will be referred to in detail.

General Prohibitions.

The Ohio and Rhode Island laws simply forbid the sale of "adulterated provisions, whether for food or drink," and the Louisiana law is nearly as concise. The following somewhat more explicit form was adopted in Michigan, and has been in substance copied by Colorado, Idaho, Indiana, Kansas, Maryland, and Montana; but some of these states have further provisions defining the terms used:

"If any person shall fraudulently adulterate, for the purpose of sale, any substance intended for food, or any wine, spirits, malt liquor, or other liquor intended for drinking, he shall upon conviction be punished by imprisonment in the county jail not more than one year, or by fine not exceeding three hundred dollars, and the article so adulterated shall be forfeited and destroyed." [3]

[1] Chicago, Ordinances (1881), Sec. 1407.

[2] Act of Congress, Approved 30 August, 1890, Secs. 2–4.

[3] Michigan, Compiled Laws (1897), Sec. 11406.

Somewhat similar legislation is found in Georgia, Maine, Missouri, South Carolina, Vermont, Virginia, and West Virginia, and also in states in which the laws are more extensive and explicit, general provisions are also found.

Another form of general prohibition in regard to adulteration and the sale of adulterated products was enacted in Illinois and has been closely copied by Iowa and New Mexico:

"That no person shall mix, color, stain, or powder, or order or permit any other person in his or her employ to mix, color, stain, or powder any article of food with any ingredient or material so as to render the article injuries to health or depreciate the value thereof, with intent that the same may be sold; and no person shall sell or offer for sale any such article so mixed, colored, stained or powdered. No person shall mix, color, stain, or powder any article of food, drink, or medicine, or any article which enters into the composition of food, drink, or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell or offer the same for sale, or order or permit any other person to sell or offer for sale, any article so mixed, colored, stained, or powdered, unless the same be so manufactured, used, or sold, or offered for sale, under its true and appropriate name, and notice that the same is mixed or impure is marked, printed, or stamped, upon each package, roll, parcel, or vessel containing the same, so as to be and remain at all times readily visible, or unless the person purchasing the same is fully informed by the seller of the true name and ingredients (if other than such as are known by the common name thereof) of such article of food, drink, or medicine, at the time of making sale thereof, or offering to sell the same."[1]

Some of the laws that have been referred to define with more or less definiteness what substances are not to be adulterated and in what adulteration consists; but those states in which the subject has received the most attention and where active measures are taken to prevent and punish adulteration usually define these things with the utmost exactness. Massachusetts has long waged an active warfare against adulteration and her statute may be given as a good example. Other states with similar laws which sometimes closely follow that of Massachusetts are California, Connecticut, District of Columbia, Illinois, Indiana, Kansas, Kentucky, Michigan, Mississippi, Nebraska, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Wisconsin:

"An article shall be deemed to be adulterated within the meaning of this act,—

"(*a*) In the case of drugs,—(1.) If, when sold under or by a name recognized by the United States Pharmacopœia, it differs from the standard of strength, quality, or purity laid down therein, unless the order calls for an article inferior to such standard, or unless such difference is made known or so appears to the purchaser at the time of such sale; (2.) If, when sold under or by a name not recognized in the United States Pharmacopœia but which is found in some other pharmacopœia, or other standard work on *materia medica*, it differs materially from the standard of

[1] Illinois, Annotated Statutes (1896), Chapter 38, Sec. 27.

strength, quality, or purity laid down in such work; (3.) If its strength or purity falls below the professed standard under which it is sold:

"(*b.*) In the case of food,— (1.) If any substance or substances have been mixed with it so as to reduce, or lower, or injuriously affect its quality or strength; (2.) If any inferior or cheaper substance or substances have been substituted wholly or in part for it; (3.) If any valuable constituent has been wholly or in part abstracted from it; (4.) If it is an imitation of, or is sold under the name of, another article; (5.) If it consists wholly or in part of a diseased, decomposed, putrid, or rotten animal or vegetable substance, whether manufactured or not, or, in the case of milk, if it is the produce of a diseased animal; (6.) If it is colored, coated, polished, or powdered, whereby damage is concealed, or if it is made to appear better or of greater value than it really is; (7.) If it contains any added poisonous ingredient, or any ingredient which may render it injurious to the health of a person consuming it.

"The provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food or drinks, provided that the same are not injurious to health, and are distinctly labeled as mixtures or compounds. And no prosecutions shall at any time be maintained under said act concerning any drug the standard of strength and purity whereof has been raised since the issue of the last edition of the United States Pharmacopœia, unless and until such change of standard has been published throughout the Commonwealth."[1]

The act relating to the District of Columbia contains eleven other definitions of special foods and gives evidence of being a carefully prepared law.

Additional definitions of an adulterated food found in the Connecticut law are, "if made to appear of greater value than it is" or "if it contain any antiseptic or preservative not evident or not known to the purchaser or consumer."

In Ohio mixtures are allowed only if "each and every package sold or offered for sale be distinctly labled as mixtures or compounds with the name and per cent. of each ingredient therein, and are not injurious to health." The following are the provisions of the Connecticut and Tennessee laws in regard to compounds and the addition of legitimate substances:

"*Provided*, that an article or food product shall not be deemed adulterated or misbranded within the meaning of this act in the following cases: (*a*) In the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food under their own distinctive names, and not included in definition fourth of this section; (*b*) in the case of articles labeled, branded, or tagged, so as plainly and correctly to show that they are mixtures, compounds, combinations, or blends; (*c*) when any matter or ingredient is added to a food because the same is required for the protection or preparation thereof as an article of commerce in a fit state for carriage or consumption, and not fraudulently to increase the bulk, weight, or measure of the food or to conceal the inferior quality thereof; (*d*) when a food is unavoidably mixed with some extraneous matter in the process of collection or preparation."[2]

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[1] Massachusetts, Chapter 253 of 1882, Sec. 3, as amended by Chapter 280 of 1884, Secs. 5 and 7.

[2] Connecticut, Chapter 255 of 1885, Sec. 3.

The Michigan law requires that all compounds shall bear on the package the name of the manufacturer.[1]

These laws relate to the adulteration of food and drugs, and the word "food" in them is variously defined. The definition of the Massachusetts law includes "confectionery, condiments, and all articles used as food or drink by man" and the same is found in New Jersey and New York. One section of the Maryland law refers to "any article of food or dietetics." In Connecticut food is anything "used as food or drink of man, horses, or cattle."

Besides the laws in regard to adulterations in general there are many statutes dealing specifically with various kinds of food.

Drugs and Medicines.

The adulteration of drugs is specifically forbidden in seventeen states, but usually the term is used in connection with "food, liquors," etc., in a general law, or else perhaps a single brief paragraph is devoted to them. No more explicit prohibitions are found than in the general adulteration law of Massachusetts which has been copied by very many states.

Liquors and Wines.

In Colorado, the District of Columbia, Indiana, Iowa, Kansas, Maryland, Michigan, Missouri, Montana, Nebraska, New Hampshire, South Dakota, and Wisconsin "wine, spirits, malt liquors, and liquors" are mentioned in the law which forbids adulteration, and wines and liquors are also specified in the general adulteration law of Georgia, Kentucky, Maine, and Rhode Island. More extensive legislation is found in Indiana, Massachusetts, Minnesota, New York, Ohio, Pennsylvania, and Rhode Island. These laws provide that wines and liquors shall not be adulterated.[2] In the District of Columbia wines, malt liquors, and cider must not contain salicylic acid. The Minnesota law forbids adulteration with substances that are injurious when the wine or liquor is used as a beverage.

New York and Ohio also have very specific regulations in regard to the production and composition of wines, both of these states being large wine producers. By section 46 of the Public Health Law of

[1] Michigan, Compiled Laws (1897), Sec. 5012.

[2] Massachusetts, Public Statutes (1882), Chapter 208, Sec. 4:

"Whoever adulterates, for the purpose of sale, any liquor used or intended for drink, with Indian cockle, vitriol, grains of paradise, opium, alum, capsicum, copperas, laurel-water, logwood, Brazil wood, cochineal, sugar of lead, or any other substance which is poisonous or injurious to health, and whoever knowingly sells any such liquor so adulterated, shall be punished by imprisonment in the state prison not exceeding three years; and the articles so adulterated shall be forfeited."

New York the adulterations of wine are defined: by section 47, pure wine is defined as containing seventy-five per cent. pure fruit juices, and by section 48, "wine which contains less than seventy-five per cent. and more than fifty per cent. of pure grape or other undried fruit juice and is otherwise pure," shall be labelled "half wine," and if it contains less than fifty per cent. pure shall be labeled "made wine." The Ohio law is very similar to this, but it requires the labeling of "pure wine" as such with the addition of the name of the manufactory. Michigan and Pennsylvania[1] have a similar provision in regard to all alcoholic beverages. Ohio[2] has a penalty for the improper use of branded packages.

In Nebraska it is forbidden to put adulterated wines in packages marked as containing wine grown in the state.

Missouri has a law[3] which forbids the use in the manufacture of beer of anything except hops, barley, malt, and pure yeast.

In New York the law provides for the yearly analysis of samples from breweries and distilleries in the state.[4]

The penalties for the violation of these laws are usually more severe than for the violation of general adulteration laws, the maximum often being $1,000 fine or one year imprisonment and also the cost of analysis. The goods also are often forfeited. Proof of guilt is rendered easy by the provisions in Michigan, Pennsylvania, and Rhode Island, that the having in possession of adulterated liquor is *prima facie* evidence of violation of the law.

Vinegar.

Vinegar is especially mentioned in nearly a dozen states as among the substances not to be adulterated. The Massachusetts law, which has been copied in most of its features, has the following as its most important sections:

"Every person who manufactures for sale, or offers or exposes for sale as cider vinegar, any vinegar not the legitimate product of pure apple juice, known as apple

[1] Pennsylvania, Act of 14 April, 1863, Sec. 2:

"It shall be the duty of any person or persons engaged in the manufacture and sale of intoxicating malt or alcoholic liquors, or in rectifying or preparing the same in any way, to brand on each barrel, cask or other vessel containing the same, the name or names of the person or persons manufacturing, rectifying or preparing the same, and also these words, "containing no deleterious drugs or added poison;" and shall also certify the same fact or facts to the purchaser over his, her or their own proper signature."

[2] Ohio, Annotated Statutes (1900), Sec. 7074:

"Whoever puts into any barrel, cask or other vessel, branded or marked pure by any inspector in this state, adulterated liquors, or knowingly sells or offers for sale such liquors so branded, shall be imprisoned in the penitentiary not more than twelve months."

[3] Missouri, Revised Statutes (1889), Sec. 3889.

[4] New York, Revised Statutes (1895), p. 2418 (Public Health Law, Sec. 43.)

cider or vinegar, not made exclusively of said apple cider or vinegar, into which any foreign substance, ingredients, drugs or acids have been introduced, as may appear by proper tests, shall for each such offence be punished by fine of not less than fifty nor more than one hundred dollars.

"Every person who manufactures for sale, or offers or exposes for sale, any vinegar found upon proper tests to contain any preparation of lead, copper, sulphuric acid or other ingredients injurious to health, shall for each such offence be punished by fine of not less than one hundred dollars.

"All vinegars shall be without artificial coloring matter, and shall have an acidity equivalent to the presence of not less than four and one-half per cent. by weight of absolute acetic acid, and in the case of cider vinegar shall contain in addition not less than two per cent. by weight of cider vinegar solids upon full evaporation over boiling water, and if any vinegar contains any artificial coloring matter or less than the above amount of acidity, or in the case of cider vinegar, if it contains less than the above amount of acidity or of cider vinegar solids, it shall be deemed to be adulterated within the meaning of this act." [1]

In Illinois the requirement is one and one-quarter per cent. of vinegar solids, in the District of Columbia it is four per cent. of acetic acid.

In several of the states, as Maine, Wisconsin, Minnesota, Indiana, and Rhode Island it is forbidden to "label, brand or sell as cider vinegar, or as apple vinegar, any vinegar not the legitimate product of pure apple juice, or not made exclusively from apple cider." In Minnesota[2] and Wisconsin there are also stringent regulations in regard to the marking on the package of the strength of the vinegar.

In Massachusetts and Rhode Island the inspectors of milk and in several of the other states the dairy or food commissioners are intrusted with the enforcement of this law. These officers are usually given the power to enter premises and collect samples, and all persons are forbidden under penalties to obstruct them, and the reports of public analysts are *prima facie* evidence.

The proof required for a conviction for the violation of vinegar laws is well stated in Connecticut: [3]

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[1] Massachusetts, Public Statutes (1882), Chapter 60, Secs. 69–70, Chapter 257 of 1883, and Chapter 150 of 1885.

[2] Minnesota, Statutes (1894), Sec. 7020:

"All manufacturers of vinegar in the state of Minnesota, and all persons who reduce or rebarrel vinegar in this state, and all persons who handle vinegar in lots of one barrel or more, are hereby required to stencil or mark in black figures at least one inch in length, at the head of each barrel of vinegar bought or sold by them, the kind of vinegar contained in each package or barrel, together with the name of the manufacturer and location of the factory where the same is made, and the standard strength of the vinegar contained in the package or barrel, which latter shall be denoted by the number of grains of pure bi-carbonate of potash required to neutralize one fluid ounce of vinegar. Any neglect so to mark or stencil each package or barrel, or any false marking of packages or barrels, shall be deemed a misdemeanor, and shall be punished by a fine of not less than twenty-five (25) dollars, nor more than one hundred (100) dollars and costs."

[3] Connecticut, Chapters 40 and 234 of 1889, Sec. 3.

". . . No person shall sell, or offer, or expose for sale, or exchange, or solicit, or receive any order for the sale or delivery within this state or for delivery without this state for shipment into this state: first, any vinegar, as cider vinegar, not wholly produced from the juice of apples; or second, any vinegar, or article sold or to be sold as vinegar, in which has been added any drug, or any hurtful or foreign substance, or any coloring matter, or any acid other than acetic; or third, any vinegar not having an acetic acidity equivalent to the presence therein of not less than four per centum by weight of absolute acetic acid, and in case of cider vinegar, not less than two per centum by weight of cider vinegar solids upon full evaporation over boiling water; or fourth, any vinegar made in this state and purchased by the person last mentioned of the maker in a barrel, cask, keg, or other package not branded, stenciled, or painted as required by a previous section of this act. Any person violating this section of this act shall be fined ten dollars for a first offense, and for a second or later offense fifty dollars. The delivery of any of the above mentioned articles upon any order solicited or received within this state shall be conclusive evidence that the order upon which such delivery was made was for such articles, and shall render the person soliciting or receiving such order liable to the penalty above prescribed."

Molasses, Sugar, Honey, etc.

The chief adulterant of these food materials is glucose and its use for this purpose is forbidden by a statute which is found in Colorado, Iowa, Maryland, Michigan, New York, and Vermont. This law forbids any one to mix glucose with syrup or sugar in Iowa, and with syrup, honey, or sugar in the other states; but in each of the states it is permissible so to use glucose provided the per cent. of glucose is marked on the package and made known to the buyer. In Maryland glucose may be used in candy. The following is the Connecticut law in regard to molasses:

"Any person who shall adulterate any molasses, or who shall sell, or offer or expose for sale, or who shall solicit or receive any order for the sale or delivery within this State, or for delivery without this State for shipment into this State of any molasses adulterated with salts of tin, terra alba, glucose, dextrose, starch sugar, corn syrup, or other preparations of or from starch, shall be fined not more than five hundred dollars, or imprisoned not more than one year or both."[1]

In Massachusetts syrup and molasses must bear the maker's name. A similar provision is also found in the same state in regard to sugar, and in Maine in regard to both sugar and molasses. Louisiana being the chief seat of the manufacture of molasses it is not surprising that explicit laws are found in that state and also additional ordinances in New Orleans:

"Be it enacted by the General Assembly of the State of Louisiana, That whoever shall knowingly sell or offer for sale, ship or place, upon the market for sale, either by sample, hogshead, barrel, package or otherwise, any sugar or molasses adulterated with glucose or any foreign substance, without branding or stamping it as such in clear, legible letters, shall be punished by imprisonment not exceeding six months, and by a fine of not less than two hundred dollars nor more than one thousand dollars for each offense."[2]

[1] Connecticut, General Statutes (1888), Sec. 2622.

[2] Louisiana, Chapter 49 of 1886.

"That it shall be unlawful for any person or persons to engage, employ, or hire any one to adulterate any molasses, syrup, or other liquid or saccharine matter, with zinc, tin or other chemical deleterious and injurious to public health.

"That it shall be unlawful for any person or persons to sell, cause to be sold, buy or cause to be bought, to dispose of, or cause to be disposed of in any way or manner, any molasses, syrup, or any liquid, or saccharine matter, adulterated with zinc, tin, or any other chemical injurious or deleterious to public health." [1]

The following is found in Vermont:

"A person who adulterates maple sugar, maple syrup, or bees' honey with cane sugar, glucose, or any substance whatever, for the purpose of sale, or who knowingly sells maple sugar, maple syrup, or bees' honey that has been adulterated, shall be punished by a fine of not more than two hundred dollars and not less than fifty dollars for each offense. One-half of such fine shall go to the complainant." [2]

Honey.

In California, Minnesota, New York, South Dakota, and Wisconsin a special provision is made in regard to honey:

"It shall be unlawful for any person or persons within the State of Minnesota to offer for sale or have in their possession with intent to sell, sell or cause to be sold, honey compounded, manufactured from, or mixed with glucose, sugar syrup of any kind, or any substance whatever not the legitimate and exclusiue product of the honey bee, unless the package containing same is so marked and represented as such and bearing the label upon the package printed thereon in heavy Gothic capitals, eighteen point, the name of the person or persons having compounded, manufactured, or mixed the same, and the name of the substance or material from which it is compounded, manufactured, or mixed with.

"It shall be unlawful for any person or persons within the State of Minnesota to offer, or have in their possession, for sale, sell, or cause to be sold, honey which has not been made by the bees from the natural secretion of flowers and plants, but which has been stored or made by the bees from glucose, sugar, syrup, or any other material or substance fed to them; unless the same is marked, represented and designated as such, and bearing a label upon each package printed in heavy Gothic capitals, eighteen point, thereon, the name of the person or persons who fed or caused to be fed, the substance or material from which the same is stored or made, and the name of the substance or material from which the said honey is stored or made." [3]

Flour and Bread.

"No manufacturer or other person shall sell, prepare, deliver, put up, expose, or offer for sale any article, substance, or compound under or by the name of wheat, meal, graham meal, or graham flour made in imitation of pure wheat meal and not consisting exclusively and wholly of pure wheat meal, unless every box, bucket, barrel, or wrapper in or under which said article is sold, delivered, or exposed for sale bears on the top or outer side thereof, in letters not less than half an inch in length and plainly exposed to view the wards "compound wheat." [4]

The adulteration of grain and meal is also forbidden in Vermont.

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[1] New Orleans, Ordinance No. 10086, 11 December, 1894.

[2] Vermont, Statutes (1894), Sec. 4344.

[3] Minnesota, Statutes (1894), Secs. 7038-9.

[4] Maine, Supplement of Laws (1895), p. 505, Chapter 257 of 1889.

In Illinois bread is the first food named in the general adulteration law, and it is also mentioned in the Missouri law.

The adulteration of wheat flour, with other cereals, particularly maize, has increased very much of late and the war revenue law[1] takes cognizance of this fact and attempts to prevent the fraudulent sale of the compound. The law provides that makers of mixed flour shall pay a tax of $12 per year and that all packages shall be marked with the words "mixed flour" in plain black letters not less than two inches high, also with the weight of the contents, the names of the ingredients and the name of the packer and place of packing. There shall be affixed to the package the following notice:

"Notice.—The manufacturer (or packer, as the case may be) of the mixed flour herein contained has complied with all the requirements of law. Every person is cautioned not to use this package or label again or to remove the contents without destroying the revenue stamp thereon, under the penalty prescribed by law in such cases."

The flour also pays a tax of four cents per barrel, two cents per one-half barrel, one cent per one-quarter barrel, and one-half cent per one-eighth barrel or less, the tax to be paid by stamps. There is also a provision for the marking and stamping of all imported mixed flours.

Fumigated Grain.

"Any person who shall fumigate any barley, wheat, or other grain by the use of sulphur or other substance, or shall in any way, or by the use of any chemical, material, or process, affect the color or healthfulness of such grain, or who shall sell, or offer for sale, any such grain, knowing that the same has been fumigated, or the color or healthfulness so affected, shall be punished by imprisonment in the county jail not more than one month or by fine not exceeding fifty dollars."[2]

The sale of fumigated grain is also forbidden in Illinois.

Buckwheat Flour.

In Michigan adulterated buckwheat flour is defined as follows:

"SEC. 2. Buckwheat flour shall be deemed to be adulterated within the meaning of this act, first, if any substance or substances have been mixed with it so as to to lower or depreciate or injuriously affect its quality, strength or purity; second, if an inferior or cheaper substance or substances have been substituted wholly or in part for it; third, if any valuable constituent or ingredient has been wholly or in part abstracted from it; fourth, if it is sold under the name of another article; fifth, if it contains an added substance or ingredient which is poisonous or injurious to the health."[3]

Substitutes and compounds must be labeled.

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[1] Act of Congress, 13 January, 1898, Secs. 35 to 49.

[2] Wisconsin, Statutes 1898, Sec. 4606.

[3] Michigan, Compiled Laws (1897), Sec. 4995.

Saleratus and Cream of Tartar.

"Every person who shall sell saleratus, bicarbonate of soda or cream of tartar, which has been adulterated and thereby rendered an impure article, shall be fined twenty dollars, together with the cost of testing and analyzing such impure article." [1]

The law also provides for the appointment of inspectors by the towns and cities, but as the only compensation is a fee to be paid by any person who presents a sample for analysis, it is not surprising that the law is never enforced.

Baking Powders.

The question of the injurious effects of alum in baking powders has been much discussed and a very extended consideration of the subject may be found in a bulletin issued by the Department of Agriculture.[2] Opinions differ as to whether the small amount of alum remaining in food in which alum baking powder is used is injurious, and consequently opinions differ as to the advisability of legislation on the subject. In most states there is no prohibition of such a use of alum, but in Minnesota there was a very stringent law to forbid the sale of baking powders containing alum unless that fact is plainly marked upon the package. This was afterwards repealed, and the present law, which is very explicit, requires that all baking powders shall have the ingredients and amounts marked on the package.[3]

In South Dakota all compounds containing alum must be plainly so marked.[4]

Poisonous Ingredients.

The following is from Missouri:

"It shall be unlawful for any person or corporation doing business in this state to manufacture, sell, or offer to sell any article, compound or preparation for the purpose of being used, or which is intended to be used in the preparation of food in which article, compound or preparation there is any arsenic, calomel, bismuth, ammonia or alum." [5]

Poisonous Coloring Matter.

The following are some of the laws and rules relating to such coloring matter:

"Whoever by himself or by his servant or agent, or as the servant or agent of any other person, manufactures, sells or exchanges, or has in his custody or possession with intent to sell or exchange, or exposes or offers for sale or exchange, any chil-

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[1] Rhode Island, General Laws (1896), Chapter 138.

[2] Bulletin 13, Division of Chemistry, U. S. Department of Agriculture, p. 571.

Minnesota, Chapter 245 of 1899.

[4] South Dakota, Chapter 89 of 1899.

Missouri, Act of 11 May, 1899.

dren's toys or confectionery, containing or coated wholly or in part with arsenic, shall be punished by fine of not less than fifty nor more than one hundred dollars." [1]

"That no person by himself or his agent or servants, nor as an agent or servant shall manufacture, sell, offer for sale, expose for sale, or have in his possession with intent to sell, any cakes or biscuits in which yolka, yolkaline, tumeric, chrome yellow or any other substitute for eggs of like nature has been used, except there be displayed in a public manner on the package in which such cakes and biscuits are carried, or on the place, receptacle or holder in which such articles are placed for sale a label, show card or sign, on which shall be printed in letters of the English language at least three inches high and one and one-half inches wide the words, 'these cakes and biscuits are colored with an artificial substitute for eggs.'" [2]

Candy.

A little manual published in 1897 by the National Confectioners' Association[3] gives all the state legislation concerning the adulteration of candy in force 1 April, 1897. The association has evidently been very active and claimed to have secured legislation in twenty states. The avowed purpose of the association is to secure laws against noxious adulterant as distinguished from fraudulent ones.

The act as drawn up by this association has evidently served as the basis of the law in at least twenty-six states,[4] though as is usual in such cases it has been variously modified by the wisdom of committees and legislatures, but unlike many such acts, its main purpose does not seem to have been subverted by any such amendments. The writer does not know what was the form of the act as drawn by the association, but the law in Minnesota would appear to be typical of this class of legislation:

"No person shall, by himself, his servant or agent, or as the servant or agent of any other person or corporation, manufacture for sale or knowingly sell or offer for sale any candy adulterated by the admixture of terra alba, barytes, tale or any other mineral substance, by poisonous colors or flavors or other ingredients deleterious to health." [5]

In Maine in addition to the substances usually specified as "deleterious" there are named "brandy, whiskey, rum, wine or any alcoholic liquor in liquid form," and it is also forbidden to "offer for sale any candy under the name of brandy, whiskey, rum, or wine drops," and the

[1] Massachusetts, Chapter 374 of 1891:

[2] New Jersey, Laws of 1895, p. 473.

[3] The secretary in 1897 was F. D. Seward, of the F. D. Seward Confectionery Company, St. Louis. The book bears the imprint of the Confectioners' Journal Print, Philadelphia.

[4] The states which have this form of law are Alabama, Connecticut, California, Delaware, Georgia, Illinois, Indiana, Maine, Maryland, Michigan, Minnesota, Missouri, Montana, Nevada, New Hampshire, New Jersey, North Dakota, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, and Wyoming.

[5] Minnesota, Act of 25 April, 1895.

prohibition relates to "lozenges" as well as candy. In Maryland a narcotic is not to be added to candy. The following is the Massachusetts law in regard to alcohol in candy:

"No person shall sell to any child under sixteen years of age any candy or other article, inclosing liquid or syrup containing more than one per centum of alcohol."[1]

Besides the states mentioned, several have provisions in their food laws in regard to candy. In Massachusetts "confectionery" is included in the definition of food by Chapter 171 of 1886 and the same word is found in the similar law in New York, and in the Wisconsin and Kentucky adulteration law it is "candy or sweetmeat," and in Illinois "candy and confection," and in Mississippi "candy, confects, and sweetmeats" that are controlled by the law.

The Montana law, and the Vermont law referred to on page 331, appear to be the only laws which forbid the use of glucose in candy.

For the use of arsenic in candy see the Massachusetts law on page 333.

Fruit Jelly.

"No person, firm, or corporation in this State shall manufacture for sale, or sell, or offer or expose for sale, as fruit jelly or fruit butter, any jelly or imitation fruit butter or other similar compound made or composed in whole or in part of glucose, dextrine, starch or other substances, and colored in imitation of fruit jelly or fruit butter; nor shall any such jelly, fruit butter or compound be manufactured, or sold, or offered for sale, under any name or designation whatever, unless the same shall be composed entirely of ingredients not injurious to health, and shall not be colored in imitation of fruit jelly, and every can, pail, or package of such jelly or butter sold in this State shall be distinctly and durably labeled "Imitation fruit jelly or butter," with the name of the manufacturer and the place where made. Whoever violates the provisions of this section shall be deemed guilty of a misdemeanor, and when convicted thereof shall be punished by a fine of not less than fifty nor more than five hundred dollars, or by imprisonment in the county jail or State House of Correction and Reformatory at Ionia for not less than ninety days nor more than two years, or by both such fine and imprisonment in the discretion of the court."[2]

A more extensive and carefully prepared law on this subject is also found in Minnesota.[3] South Dakota and Illinois also have jelly laws.

Coffee.

The adulteration of ground coffee is very common and the manufacture of the coffee berries themselves is not unknown, yet there appears to be very little special legislation on this subject. Adulterations of coffee are usually punished through the general laws. The following is found in Michigan:

"No person shall manufacture or sell, or offer for sale, any manufactured or artificial coffee berry in imitation of the genuine berry. No person shall manufacture,

[1] Massachusetts, Chapter 333 of 1891.

[2] Michigan, Compiled Laws (1897), Sec. 5022.

[3] Minnesota, Chapter 167 of 1897.

sell or offer for sale any ground or prepared coffee, which is adulterated with chicory or other substances not injurious to health, unless each package thereof shall be distinctly labeled or marked "Coffee compound," together with the name and address of the manufacturer or compounder thereof." [1]

In the District of Columbia coffee must be made entirely of the seed of *caffea arabica*.

Olive Oil.

The statute in California[2] provides that the producer or dealer in olive oil may prepare a label and file the same with the state board of agriculture together with the affidavit that the oil will be pure. The manufacture or sale of adulterated oil is forbidden. In the District of Columbia olive oil must be made exclusively from the olive berry (*olea Europæa*).

Catsup.

The San Francisco Board of Health[3] has established a standard of tomato catsup. It must contain twenty-five per cent. of organic solids including ash, and be free from antiseptics and coloring matter.

Eggs.

Artificial eggs are said by the lay press to be manufactured by ingenious Parisian artisans, but they do not appear to have been heard of in this country. Nevertheless a substance has been sold which is intended for use by bakers to make cake appear as if eggs had been used. See the New Jersey Law on page 334.

Lard.

The practice of adding beef suet and cotton seed oil to lard met with great opposition among the manufacturers of pure lard and as a result of the agitation laws against the adulteration of lard are found in a number of states. Good laws in regard to lard adulteration or lard mixtures are found in Maine, Michigan, Minnesota, and Massachusetts. The law in the latter state is as follows:

"No manufacturer or other person shall sell, deliver, prepare, put up, expose or offer for sale any lard, or any article intended for use as lard, which contains any ingredient but the pure fat of swine, in any tierce, bucket, pail, or other vessel or wrapper, or under any label, bearing the words "pure," "refined," "family," or either of them, alone or in combination with other words, nor unless every vessel, wrapper, or label, in or under which such article is sold or delivered, or prepared, put up, or exposed for sale, bears on the top or outer side thereof, in letters not less than one-half inch in length and plainly exposed to view, the words:—Compound Lard." [4]

[1] Michigan, Compiled Laws (1897), Sec. 5024.

[2] California, Chapter 47 of 1891.

[3] San Francisco, Report of Board of Health (1897), pp. 8, 209.

[4] Massachusetts, Chapter 449 of 1887, Sec. 1.

The most stringent and complete law is that of Minnesota.[1] This law forbids the sale "as lard of any substance not the legitimate and exclusive product of the fat of the hog," unless it shall be labeled in letters not less than one inch in length, and shall have the name of the manufacturer and the location of the manufactory in letters of the same size, and the names and proportions of the ingredients in letters one-half inch in length. If it is a "mixture or compound of animal or vegetable oils or fats other than hog fat in the form of lard," it shall be labeled "Lard Substitutes." If it is a mixture of the above with lard it shall be labeled "Adulterated Lard." Dealers and traders must also mark goods in a similar manner with letters half the above size, and must give a card to the customer stating the facts. Keepers of hotels and restaurants are controlled by the following:

"Every person who manufactures for sale, or who offers or exposes for sale or sells, or who serves to guests as keeper of hotel, restaurant, dining room, or in any other capacity, articles of food which have been prepared, either wholly or in part, with lard substitutes, or adulterated lard as herein before defined, shall at the time of sale furnish to the purchaser a card upon which is distinctly and legibly printed the words, 'This food is prepared with lard substitute (or adulterated lard),' or in case no bill of fare is provided, there shall be kept constantly posted upon each of the sides of the dining room, in a conspicuous position, cards, upon the face of which is distinctly and legibly printed in the English language, and in letters of sufficient size to be visible from all parts of the room, 'Lard substitute (or adulterated lard) is used in the preparation of the food served here.'"

The state dairy commission is to enforce the law and has the power of search and seizure. The penalty is twenty-five dollars to fifty dollars or thirty to sixty days.

EXECUTION OF FOOD LAWS.

Food laws may be executed by the federal government and by the states and by municipalities. The laws, as has been shown, are federal, state and local, but most laws are of little value, unless there are efficient officers charged with their execution. This is most assuredly true of food laws. Great pecuniary rewards often tempt their violation and often the nature of the offence is such that it escapes detection unless there is an expert constantly on the alert to discover it. The whole value of these laws depends on the efficiency of their execution. There must be not only statutes and ordinances, but inspectors and chemists. The latter are even more important than the former, for the mere exposure and publication of frauds even if there are no laws to reach the offender, often have a most wholesome deterrent effect.

[1] Minnesota, Statutes (1894), Secs. 7026–37.

I. Federal Inspection.

The federal government has laws against the importation of adulterated food and drugs, the importation of adulterated tea, and the importation of diseased cattle. There is also the oleomargarine law and the flour law. The United States has also by virtue of its control of interstate commerce forbidden the transportation of diseased meat from one state to another. The enforcement of the importation law is in the hands of the secretary of the treasury, who makes use of the regular custom house inspectors and employs such experts as may be necessary. The oleomargarine law is executed by the internal revenue commissioner and is administered chiefly from a revenue point of view.

The government also inspects the exports of cattle and meat, but this is of value to the producers of our own country and the consumers of other countries and does not affect our own consumers.

The control and inspection of interstate commerce in meat and other slaughter-house products is by far the most important sanitary work of the government relating to foods. By the act of 3 March 1891, the inspection of the slaughtering of animals intended for interstate or foreign trade was inaugurated under the control of the bureau of animal industry of the department of agriculture. It is intended that this inspection shall cover all the animals slaughtered for these trades, but at first it was possible to inspect at only a few of the most important slaughtering centres. Even now the inspection does not include all animals even for the interstate trade, though in 1898 these inspections were carried on at 138 abattoirs in thirty-five cities. The number of animals inspected was 51,335,398, of which 116,176 were condemned. Two million eight hundred and two thousand eight hundred and forty-six samples of pork were examined microscopically, of which about one per cent. were condemned. All animals are inspected by a veterinarian before killing and if they are not passed they are sent to special pens, the most are slaughtered and so disposed of that they cannot be used for food. The rest are kept until they recover or die. Pregnant animals are sent to the country until such times as they may be fit to kill. Veterinary inspectors are constantly on the killing floor and examine the viscera of each animal slaughtered. Every quarter of beef bears a numbered tag. In the case of hogs, one or more samples are cut from each carcass which is tagged and the samples numbered in duplicate. Each sample is twice examined microscopically for trichinosis. Piece examination of bacon and ham is carried on to some extent and the packages that are passed are stamped. The carcasses that are condemned should be sent at once to the tankage room, but their disposition cannot always be controlled by the federal inspectors, and for this

reason the co-operation of the local inspectors is always to be desired. The cost of the inspections in 1898 was 0.8 cent per head.

II. State Inspection.

The inspection of meat, fish, vegetables, fruit, milk, and other perishable material is usually in the hands of the local authorities as the state could not without an army of inspectors properly do this work. This is not true of Maryland where food inspectors are appointed by the state board of health, who look after meat, fish, fruit, and animals intended for slaughter; but the state board of health, besides the special inspectors employed by it, invests all local health officers with the authority of inspectors.[1]

The control of adulterations and substitutions is however usually a state charge and is not given much attention by the cities and towns. In some states, as Indiana, Maryland, Massachusetts, New Hampshire, and New York the state board of health is required to take cognizance of these matters; but in other states it is the dairy or food commissioner who is invested with this control. The states having such a commission are Colorado, Connecticut, Illinois, Michigan, Minnesota, New Jersey, Ohio, Oregon, Pennsylvania, Washington, and Wisconsin.

In Massachusetts three members of the state board of agriculture appointed by the governor constitute a dairy bureau, and in New York the commissioner of agriculture enforces the law in regard to dairy products, but not in regard to other foods. In Kentucky the director of the agriculture experiment station is to appoint food inspectors and fix the standard for food materials when they are not fixed by statute. Such food commissioners are usually appointed by the governor, but in Ohio the commissioner is elected by the people, and in Oregon by the legislature, in New Jersey he is appointed by the state board of health, and in Pennsylvania by the state board of agriculture. The term of office is two years, and the salary varies from $1,000 in Oregon to $2,000 in New Jersey and Pennsylvania, and in Wisconsin $2,500. The commissioner usually has a clerk or secretary and has one or more assistants provided, or may appoint inspectors. The state board of health or the food commissioners are usually empowered to appoint or employ chemists and analysts; but in Wisconsin the analyses are to be made at the state university, in Colorado at the state agricultural college, and in Connecticut and Kentucky at the experiment station or by any state chemist, and in the District of Columbia the commissioner of internal revenue shall make the analysis. In Ohio any chemist may

[1] Maryland, Report of State Board of Health (1891), p. 26, Rule 1.

be employed. It is usually provided that the official analysis shall be *prima facie* evidence.

The following are the rules governing the inspectors and analysts in New Jersey:

DUTIES OF INSPECTORS.

"1. The Inspector is to buy samples of food or drugs, and to seal each sample in the presence of a witness, if prosecution is intended.

"2. The Inspector must affix to each sample a label bearing the number as authorized for that purpose.

"3. Under no circumstance is the inspector to inform the analyst as to the source of the sample before the analysis shall have been completed.

"4. Inspectors are to keep a record of each sample as follows:

(1) Number of sample.
(2) Date and time of purchase.
(3) Name of witness to sealing.
(4) Name and address of seller.
(5) Name and address of producer, manufacturer, or wholesaler, when known, with marks on original package.
(6) Name of analyst and date of sending.
(7) How sent to analyst.

"5. If the seller desires a portion of the sample, the inspector is to deliver it under seal. The duplicate sample left with seller should have a label containing the the same marks as are affixed to the portion taken by the inspector.

"6. The inspector is to deliver the sample to the analyst, taking his receipt for same, or he may send it by registered mail, express, or special messenger.

"1. The chemist or analyst is to analyze the samples immediately upon receipt thereof.

"1. Samples, with the exception of milk and similar perishable articles, are to be divided by the analyst and a portion sealed up, and a copy of the original label affixed, or the original package preserved, after removing sufficient for analysis, for three months.

"3. Should the result of an analysis be disputed in any case in which analysis has been ordered by the state board of health, the defendant or person selling the sample in question, or his attorney, may appeal to said board through its secretary, and said secretary shall then require another chemist to repeat the analysis, using a duplicate portion of the original sample. But when such an appeal shall be made, a sum of money sufficient to cover the expenses of the second analysis shall be deposited with the secretary of the state board of health; which sum shall be paid to the analyst designated, as required above, to make said second analysis, in case the analysis shall be found to agree with the first in all essential particulars. But in case the sample has been procured by the dairy commissioner, or inspectors appointed by him, any such appeal shall be to the dairy commissioner, and the money deposit for the second analysis be made with him, subject to the conditions above stated.

"4. In the case of all articles having a standard of purity fixed by any of the laws of the state, the certificate of the analyst should show the relation of the article in qnestion to that standard.

"5 Each analyst should keep a record-book, in which should be entered notes as follows:

(1) From whom the sample is received.
(2) Date, time and manner of receiving the sample.
(3) Marks on package, sealed or not.
(4) Results of analysis in detail.

"6. At the completion of the analysis, a certificate in the form given below shall be forwarded to the board of health if the analysis had been ordered through it, or to the dairy commissioner if ordered through him.

CERTIFICATE.

To whom it may concern:

"I,....., a Chemist appointed by the State Board of Health of New Jersey, under the provisions of an act entitled 'An act to prevent the adulteration of food or drugs,' approved March 25th, 1881, do hereby certify that I received from.....on the..... day of.....188.. a sample of..... sealed as required by the rules of said Board, and bearing the following marks to wit:.....

.....

"I carefully mixed said sample and have analyzed the same, and hereby certify and declare the results of my analysis to be as follows:.....

.....

..... [*Signature.*]

"7. Samples sent to analysts are to be retained for the space of three months."

Massachusetts has probably done more than any other state to stop adulteration. The work of the state board of health was begun in 1882, and up to November, 1899, 110,000 samples had been examined,[1] 1,500 prosecutions entered, of which thirty-five were appealed to the supreme court. About $10,000 annually are expended and the average cost of collection, examination, and prosecution per sample is $1.34. During the period covered by the operations of the board the per centage of adulterations has diminished one-half. Investigations in the neighboring state of Rhode Island where there is no attempt to suppress adulteration show that it is much more common than in Massachusetts. There can be little doubt that the amount expended for this service in Massachusetts is saved many times to the citizens.

III. Local Inspection.

The authority to appoint inspectors is usually exercised by cities by virtue of their grant of general sanitary powers, but it is sometimes specifically conferred. Thus in Massachusetts[2] it is provided that the board of health shall appoint one or more persons to be inspectors of provisions and of animals intended for slaughter or the production of milk. In Utah cities of 10,000 and over are required to appoint meat inspectors who are to inspect all cattle before slaughtering, and also the carcasses after slaughter and tag them. They may also be required to perform other duties relating to food inspection. In Mississippi[3] the

[1] Paper by Dr. S. W. Abbott, Papers American Public Health Association, Vol. 25, p. 277.

[2] Massachusetts, Chapter 408 of 1899, Sec. 20.

[3] Mississippi, Code (1892), Sec. 2098.

county supervisors and mayors and aldermen have similar powers, but the law is permissive. In Louisiana[1] the law requires the regular police to enforce the food laws, but it is useless to expect any efficient action without special officers, and in New Orleans special inspectors are employed. A few cities, as Providence,[2] and Baltimore,[3] have authority granted by special acts. Most cities of 50,000 inhabitants or over and a number which are smaller than this have one or more special inspectors of provisions exclusive of milk inspectors. In smaller cities and towns the labor of looking after the food supply is performed by a general sanitary inspector or perhaps by the health officer himself and is only one of his multifarious duties. Even in communities of considerable size, the inspection of food is joined to the other duties of a single officer. Thus in Knoxville, whatever food inspection there is, is done by the secretary of the board of health. In Terra Haute it is one the duties of the sanitary inspector, and in Youngstown, O., of the sealer of weights and measures. In Nashville the food inspector also fumigates and inspects houses. It might be imagined that the duties of food inspector could be well joined with those of milk inspector, but this is not often done. The reason presumably is that a milk inspector is usually a chemist and whether or not all his time is given to the community his services are too valuable to permit of his making routine inspection of markets and slaughter-houses. The duties of the two offices are, however, coupled in Atlanta (where formerly the same officer was inspector of plumbing), Allegheny, Cleveland, Colorado Springs, Columbus, Evansville, Kansas City, Lynn, Meadville, Penn., Oakland, Cal., Rochester, Salt Lake City, Scranton, Tiffin, O.; but in Atlanta the inspector only collects samples and the analyses of the milk are made by the city chemist, and in Columbus and Lynn samples of milk are not analyzed by the inspector, but are sent to a chemist. In Cleveland the milk and food inspector, who is a chemist, has the assistance of a messenger and a sanitary policeman, and much of the control of markets is in the hands of the superintendent of markets.

In San Francisco the market inspectors are required to visit all public institutions and inspect the meat to see if the contracts are fulfilled.[4]

In those cities which own or control public markets, whether or not this department is under the control of the board of health, as it is in Cincinnati, the superintendent of markets and his subordinates perform

[1] Louisiana, Act of 3 March, 1880.

[2] Rhode Island, Act of 5 March, 1858.

[3] Maryland, Chapter 53 of 1894.

[4] San Francisco, Rule of Board of Health, 20 January, 1892.

a large part of the work of supervision of the character of the goods sold. Sometimes this is simply an implied part of their duties, but again it is strictly prescribed, as in Cincinnati[1] and Reading, and in the latter city the commissioner of markets is also sealer of weights and measures, but a special food inspector is desired.

In the larger cities more than one inspector is needed to look after foods, and sometimes the different inspectors have their duties somewhat specialized. In St. Paul there is one live stock inspector, and one meat inspector who looks after provisions in general. In Boston there is a like arrangement, only there are two provision inspectors. In the District of Columbia there is besides the three food inspectors, an inspector of marine products[2] and a dairy inspector. In Baltimore, Minneapolis, and San Francisco there is a special inspector for bakeries. In Pittsburgh there is a meat inspector and a vegetable inspector. In New York there were in 1896, three fruit inspectors, three meat inspectors and two fish inspectors. In Philadelphia the meat inspectors are in the bureau of police.

There are three general classes of food inspectors, although the distinction between them is not always well marked and the functions of each are in some cases performed by one and the same person.

First. There is a live stock inspector. He must have some knowledge of veterinary science and to be entirely successful should be a skilled veterinarian and have a thorough knowledge of pathological processes and be an adept in the use of the microscope. Such inspectors are mostly in the employ of the United States at the great slaughtering centres, but they are also found as local inspectors in a few cities, as Boston, Buffalo, Denver, Nashville, New Orleans, Omaha, and St. Paul. Some smaller places, as Brookline and Haverhill, Mass., and Oakland, Cal., employ veterinarians for the routine market inspections.

Second. There is the inspector of groceries, drugs, condiments, etc. Such inspectors are in some cases skilled chemists. In other cases they are merely collectors of samples for analysis, also obtaining evidence for the prosecution of offenders. This class of inspectors are mostly state officials.

Lastly. There are the "meat," "food," and "provision" inspectors whose duty it is to make frequent inspection of markets, peddlers' wagons, shops, wholesale and commission houses, wharves and vessels, and to determine the wholesomeness of the goods offered for sale. The

[1] Cincinnati, Manual Health Department 1898, pp. 111–113.

[2] Most of his work is done on the wharf where oysters and crabs are discharged and in the summer when the oyster trade is small he inspects watermelons and other truck brought by boat.

goods examined by such inspectors are such as meat, fish, poultry, fruit, vegetables, etc. Inspectors of this kind are usually employees of the cities and towns and are members of the health department.

Sometimes, as in Mississippi, inspectors are under bond (in that state $500), to "perform their duties without fraud, favor, or partiality." In St. Louis the meat inspectors are under $4,000 bonds.

The following list shows how many inspectors are employed and what salaries are paid in a number of important cities:

City.	Number of Inspectors.		Annual Salary.
Allegheny	1	meat and milk	$1,000
Baltimore	1	meat and provision	1,000
	1	bakery	1,200
Boston	1	veterinarian	2,200
	1	inspector	1,600
	1	inspector	1,200
	1	inspector	900
Brookline	1	provision and milk	600
Brooklyn (Borough of)	1	chief	2,500
	4	food	1,000
	4	meat	1,200
	1	meat	1,000
	1	meat	900
Chicago	1	meat	1,200
	5	meat	1,000
	3	ice	900
Cleveland	1	food and milk	1,000
	1	food and milk	900
	1	food and milk	600
	1	food and milk	300
Columbus	1	meat and milk	1,000
Denver	1	meat	1,080
	1	meat	900
District of Columbia	3	food	1,200
Evansville	1	food and milk	900
Fitchburg	1	food	900
Haverhill	1	meat and provision	900
Louisville	1	live stock	1,200
	1	live stock	900
Lynn	2	food and milk	800
Milwaukee	4	food	1,100
Minneapolis	1	meat	1,350
	1	bread and milk	1,100
Newark	2	food	1,000
New Orleans	1	veterinarian	1,500
	13	food	600
New York (Borough of Manhattan)	1	chief	2,500
	8	fruit	1,200
	4	meat	1,200
	3	fish	1,200
	1	fish	600

City.	Number of Inspectors.		Annual Salary.
Philadelphia	1	meat	1,350
	1	meat	1,000
	1	meat	925
	1	veterinarian	1,000
Pittsburgh	1	meat	1,800
	1	vegetable	900
Providence	1	provision	1,200
St. Louis	6	food	1,440[1]
St. Paul	1	meat	900
	1	live stock	900
San Francisco	8	food and milk	900
	1	bakery	900
	5	market	900
Syracuse	1	food	720[1]

All inspectors of whatever class must have free access to all goods to be examined, and must often have power to take samples for further examination. Such power is specifically given by statute in many states, and is also conferred by the regulations of many cities. Among the states which have such laws or laws forbidding interference with inspectors may be mentioned, Colorado, Massachusetts, Minnesota, New Jersey, Ohio, Oregon, and Wisconsin. The Massachusetts law merely forbids any one to hinder, obstruct, or in any way interfere with any properly appointed inspector, analyst, or other officer in the performance of his duty.

The Massachusetts law provides that when it is believed that any unwholesome provisions are concealed, the inspector may, on complaint to the proper magistrate, obtain a search warrant and seize the goods. In these cases the magistrate is to determine whether the articles shall be destroyed or returned to the owner.

The most stringent law is that of Minnesota in regard to dairy products:

"The said commissioner and assistant commissioners, and such experts, chemists, agents, and counsel as they shall duly authorize for the purpose, shall have access, ingress, and egress to all places of business, factories, farms, buildings, carriages, cars, vessels, and cans used in the manufacture and sale of any dairy product or any imitations thereof. They also shall have power and authority to open any package, can, or vessel containing such articles which may be manufactured, sold, or exposed for sale, in violation of the provisions of this act, and may inspect the contents therein, and may take samples therefrom for analysis."[2]

In order to prevent adulteration frauds it is necessary for samples to be taken from the suspected goods. This is provided for in the Minnesota law referred to above where the dairy commissioner and his

[1] Inspectors are required to furnish their own horse and buggy.

[2] Minnesota, Statutes (1894), Sec. 7000.

[illegible]

[illegible]

[illegible]

carcasses from which they have been removed; provided, however, that in the event of the failure of the inspector to make such inspection before 6.30 P. M. in summer (April 1, to September 30), and 5.30 P. M. in winter (October 1 to March 31) each day, permission is hereby granted to the butchers to remove such organs.

"At least one inch of the diaphragm or skirt of all carcasses of all slaughtered animals shall be left on the animal slaughtered, until the meat inspector shall have examined, inspected, and passed the same, and that the parietal pleuræ or the lining of the chest cavity, and the parietal peritoneum or casing of the abdominal cavity, ordinarily removed in the process commonly known as "stripping," shall be allowed to remain upon the carcass, and shall not be removed therefrom by the process known as "stripping" until after the inspections of the meat inspector.

"In the event of the rejection of any animal by the said inspector, permission is hereby granted to the owner of said animal so rejected to kill another one in order to replace same, even after the hours aforementioned.

In New Orleans all meat imported into the city and all slaughtered in the city must be stamped by the inspector before it is offered for sale. In Colorado Springs, Fall River, and Haverhill a similar rule is in force.

The inspection of animals immediately before or at the time of slaughter is now largely in the hands of the federal authorities. Yet the government inspectors are not located at any but the larger establishments so that there is still a considerable field for local work. Moreover the federal inspectors have no authoritative control over the disposal of any diseased animal or carcass unless it is destined for interstate or foreign trade. It can be used for any purpose within the state where slaughtered. The assistance of local inspectors is needed to see that improper use is not made of such food material. Local inspectors should and usually do work in entire harmony with the inspectors of the department of agriculture. In Chicago five local inspectors are constantly on duty at the Union Stock Yards. Four inspectors are also employed to look out for dressed meat that arrives on the cars. In order to avoid the inspectors at Chicago, animals that are likely to be condemned are retained at points outside of Chicago and slaughtered, and it is to look out for this meat that inspectors watch over railroad traffic in dressed meat. The following rules have been adopted in Chicago to enable the local inspectors to prevent the use of condemned food:

"That all meat condemned in the City of Chicago by Government or State Meat Inspectors, shall be destroyed under the supervision and subject to the directions of the City Meat Inspectors.

"That no owner of a slaughter-house shall slaughter cattle, sheep, or hogs after the hour of 7.00 o'clock P. M., or on Sundays, without first notifying the City Meat Inspectors.

"All emaciated cattle condemned in the City of Chicago shall be destroyed by, and under the supervision and subject to the directions of, the City Meat Inspectors.

"No carcasses of dead animals shall be brought within the precincts of any slaughter-house in the City of Chicago." [1]

[1] Chicago, Ordinances of 4 January, 1897.

In Buffalo the same sort of control is exercised in order to secure the immediate destruction of food condemned by federal and local inspectors.

The inspection of food is usually at slaughter-houses or in markets and shops. The inspection of places where food is prepared for immediate consumption is generally neglected, or at least there is little account of such in the reports of the inspectors; but in two cities at least, Denver and New Orleans, the inspection of hotel and restaurant kitchens is required.

Inspectors of provisions should, of course, keep a record of inspections made, and particularly of all goods condemned. An ordinary blank book may be used for this as in Providence, one book for each ward, of convenient size to be carried in the pocket and enough space given to each market to record the inspections and condemnations for the year. The form used in New York City is shown below.[1]

Daily, weekly or monthly reports are required of the inspectors in many cities. These are often made on printed forms, good examples of which may be seen in Denver, the District of Columbia, and New York.

Persons Liable and Acts Forbidden.

In a great many of the laws in regard to unwholesome and adulterated food the penalty is upon the person who "knowingly" sells-adulterates, etc. This is very often the case in the older laws, particularly those relating to "decayed, diseased and unwholesome provisions." It is also found in some of the adulteration laws, as in Iowa, in the oleo law; in Maine, in the vinegar and molasses law; in Ohio, in the vinegar law; in the District of Columbia and Maryland, in the general adulteration law; and in many milk laws. Recently the word has been stricken from the Michigan oleo law where it had for some time been a considerable hindrance to successful prosecution. The Massachusetts law, copied by many other states, makes it an offence to "knowingly" sell veal under four weeks of age, but the word is omitted from the prohibition of slaughtering calves under age, thus rendering prosecution af this latter offence much the easier. The addition of this

[1] Date ..... Hour .....
Street and Number .....
Name of Owner .....
Business .....
From whom Purchased .....
Condition of Store .....
Condition of Ice Box .....

Condemned.

Character.	Pounds.	Total.
Total		

No. of Inspection .....

Remarks

word throws directly upon the plaintiff the burden of the proof that the accused has knowledge that the goods in question were "diseased, corrupted or unwholesome." This is, of course, a difficult thing to prove, and many a guilty person has as a consequence escaped.

The following which is found in many of the candy laws illustrates the strictness and specific character of much of this food legislation:

"No person, firm or corporation shall, either directly or by agent or employe, or as the agent or employe of any other person, firm, or corporation, manufacture for sale, or knowingly sell, or offer for sale. . . ."[1]

The making of the selling only of the unwholesome provisions an offence greatly detracts from the value of such laws. If it is necessary to prove a sale of unwholesome provisions before any action can be taken, very little preventive work can be done. Hence these regulations often prescribe other offences than selling. Thus in Buffalo[2] "No person or persons shall bring into the city, sell, offer, or have for sale for human food." In Oregon it is forbidden "to sell or exchange or offer for sale or exchange." And in New York City it is provided

"That no person shall sell, or give to any other person, or permit such other person to get (having the right and ability to prevent the same) any drink, food or dress, when such first-named person may have reason to think or believe that such drink, food or dress may cause danger or detriment to life."[3]

In Milwaukee it is forbidden to "give away for food" unwholesome materials.

Not only is it forbidden in Illinois to sell butterine, but no one "may give to any person" a substitute for butter. The same provision is found in Louisiana.

The Cleveland ordinance defines still further what shall be deemed evidence of offering for sale:[4]

"The fact of any cattle, sheep, hog or lamb being in any stock yard or slaughter-house pen shall be considered sufficient evidence that the same is being exposed there for sale; and the fact that any carcass of any cattle, hog, sheep or lamb, or any part thereof, is found in any slaughter-house, or any public or private market or place, dressed and prepared as such meats usually are for market, shall be deemed sufficient evidence that the same is for sale for human food."

In Iowa,

"Whoever shall have possession or control of any imitation butter or imitation cheese or any substance designed to be used as a substitute for butter or cheese contrary to the provisions of this act shall be construed to have possession of property with intent to use it with the intent of committing a public offence."[5]

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[1] Nevada, Compiled Laws (1900), Sec. 5076.

[2] Buffalo, Ordinances (1892), Chapter 25, Sec. 84.

[3] City of New York, Sanitary Code (1899), Sec. 57.

[4] Cleveland Ordinances, Chapter 30, Sec. 536.

[5] Iowa, Code, (1897), Sec. 2521.

In Iowa no person may have unmarked butterine in his possession except for consumption by himself or family. In Iowa no carrier shall receive butterine not properly marked. The Michigan law is as follows:

"The presence of such oleomargarine, butterine, or other substance resembling butter, in any such place before mentioned where food is sold or furnished to persons paying for the same, shall be *prima facie* evidence in any court before which any person violating the provisions of this act may be brought for examination or trial, that such person has sold and offered for sale as butter, such substance resembling butter." [1]

As was shown above, the Massachusetts and most of the other state laws forbid the sale of unwholesome provisions only "for meat or drink," and sometimes the law goes further as in Buffalo, and forbids its sale for "human food," or in Maryland when "intended to be used for human food." [2] Under such provisions it would be possible to sell unwholesome food for the use of animals or for a fertilizer, but unless the use of the food is so specified, it would not be possible to sell it at all. It is not so specified in the Louisiana law. On the other hand, the usual form of the law might at times prevent a conviction, owing to the difficulty of proving that the goods were sold for "meat or drink" or for "human food."

The Michigan adulteration law is as follows, and similar provisions are found in the Massachusetts oleo law and in other states:

"The taking of orders or the making of agreements or contracts, by any person, firm, or corporation, or by any agent or representative thereof, for the future delivery of any of the articles, products, goods, wares, or merchandise embraced within the provisions of this act, shall be deemed a sale within the meaning of this act." [3]

Not only is it forbidden to sell and manufacture adulterated substances, but in some instances it is forbidden to sell food which contains such articles. Thus the Connecticut oleo law reads:

"No baker or vender of food shall sell or expose for sale any article of food containing imitation butter, unless such baker or vendor shall maintain the same kind of a sign as hereinbefore prescribed, in the way and manner prescribed in that connection, except that the word "used" shall be substituted for the word "sold." If the selling be done from a wagon or other vehicle, such vehicle shall conspicuously bear such a sign.

"No keeper of a hotel, boarding house, or restaurant, temporary or permanent, shall furnish any guest with imitation butter, or food containing it, unless such keeper shall maintain in plain sight of all guests sitting at tables where food is served such a sign or signs as hereinbefore prescribed, except that the word "used" shall be substituted for the word "sold." [4]

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[1] Michigan, Compiled Laws (1897), Sec. 4991.

[2] Maryland, Chapter 604 of 1890, Sec. 52.

[3] Michigan, Compiled Laws (1897), Sec. 5026.

[4] Connecticut, General Laws (1888), Secs. 2616–7.

Further information in regard to the wording of food laws may be obtained from the milk laws which will be considered in the next chapter.

Penalties.

The penalties attaching to the violation of the food laws, particularly the adulteration laws, are the most severe found in any of the so-called sanitary legislation. The injury to health is slight or nil but the penalty is great, while for the violation of laws which may produce vast injury to health the penalty is often nominal. The severity of food law penalties does not represent the feelings of the public in regard to the importance of the subject, but rather the legislative influence of the commercial interests which usually secure this class of legislation.

Violation of food laws are of course punished by fine or imprisonment. The fines range from a ten dollar minimum in Tennessee to a two thousand dollar maximum in Illinois, and the imprisonment from thirty days to five years. Three hundred dollars to five hundred dollars or one year are common maxima.

These are not the only punishments inflicted. Unwholesome or adulterated foods are usually seized and destroyed. Nearly all the laws, state and municipal, contemplate or provide for the destruction of condemned material. Unfortunately the federal law in regard to live stock inspection cannot constitutionally make use of this police power, and this is the chief reason why the federal inspectors at the great slaughtering centres need to be aided by local laws and inspectors to secure the destruction of animals which have failed to pass the inspectors of the department of agriculture. Hence the rule in Chicago (see page 347) that all meat condemned by the federal inspectors shall be destroyed under the supervision of the city meat inspectors. Nearly all cities and a number of states provide that their food inspectors shall seize and destroy articles offered for sale in violation of the laws. As regards perishable articles, meat, fruit, vegetables, etc., this is the method usually pursued to prevent the sale of such as are unfit for food. The frequent routine inspection of shops permits of the seizure of a large proportion of such undesirable food and this penalty is easy of enforcement. It is, moreover, prompt, and its deterrent effect is probably almost as great as a prosecution. Sometimes the law is so worded that seizure is practically the only course. Thus in Massachusetts where the law forbids the sale of veal only when the seller knows it is under age, proof of this offence becomes almost impossible to obtain; but another act[1] permits inspectors to seize and destroy all veal

[1] Massachusetts, Public Statutes (1882), Sec. 2.

which they believe to be under four weeks of age. This power of seizure and destruction is sometimes safe-guarded. Thus:

". . . If, at the time of the seizure, the owner of the property seized notifies in writing the inspector seizing the same of his desire to appeal to the board of health, said inspector shall cause said animals, meat, fish, vegetables, produce, fruit, or provisions to be inspected by said board of health, or by a committee thereof consisting of not less than two members; and if said board or committee find the same to be tainted, diseased, corrupted or unwholesome, they shall order the same to be destroyed or disposed of otherwise than for food. If said board or committee do not so find, they shall order said animals, meat, fish, vegetables, produce, fruit, or provisions to be forthwith returned to the owner thereof." [1]

In New York, Yonkers, Memphis, and Cleveland provision is made for the presence of witnesses to determine whether or not a given article of food should be destroyed. The inspector in Cleveland is to call upon "two reputable persons competent to judge," and shall follow their decision if they agree, but if they do not agree, the inspector is to refer the matter to the health officer. In making seizures under this law three employees of the health department may make the inspections together. In most legislation no provision for witnesses is made, and the decision in regard to the condition of the goods is left to the single inspector.

After goods are condemned they should be destroyed so that they cannot by any possibility be sold to consumers. Many times their destruction is left to the dealer, in which case it is expected that the fear of a subsequent inspection to see if the order is carried out, and the threat of a fine, is sufficient to secure the end sought. Thus in some cities the owner is directly required by the law to destroy the goods, and failure to do so is punished by a fine of one hundred dollars in Atlanta [2] and of fifty dollars in Maryland. Often the provision is made that the condemned material shall be tagged by the inspector. This is required in Jersey City, Bridgeport, Newark, and St. Louis. The Newark rule is as follows:

"That upon any cattle, meat, fish, birds, fowls, fruit, nuts or vegetables being found by any inspector or other officer of the board of health, in a condition which renders the same unsafe or unwholesome for human food, it shall be the duty of said inspector or officer to affix to said article or articles a label on which shall be written or printed the words 'Condemned by direction of the Board of Health, Newark, N. J.' and when anything included within the provisions of this section shall be found in numbers, quantity or bulk, it shall only be necessary for said inspector or officer to affix one such label to a conspicuous part of the box, tin, basket, compartment or other place or thing containing the same, and he shall forthwith report every such condemnation at the office of the board. And no person or persons shall destroy, deface, conceal, interfere with or remove any label affixed by any

[1] Massachusetts, Public Statutes (1882), Chapter 58, Sec. 3.

[2] Atlanta, Sanitary Rules and Regulations, Sec. 100.

inspector or officer of this board as aforesaid. It shall be the duty of the owner or person in charge of any matter or substances that have been condemned, to immediately remove the same from any market, street or place, and convey the same to such place as may be designated by the inspector or officer, and such articles shall not be sold or offered for sale, nor in any way disposed of, and in case the owner or person in charge shall fail or neglect, or refuse to remove said articles within three hours after having been notified to do so, the same may be removed by the inspector or other officer of this board, the owner or person in charge paying all expenses therefor."[1]

Sometimes the destruction of the goods is secured by the inspectors pouring a little kerosene upon them which, of course, effectually prevents their sale for food. This is the practice in Providence, Colorado Springs, St. Paul, and Kansas City. In St. Louis[2] the inspectors are to mark or to mutilate the goods as they deem best to indicate their condemnation, and the owners shall within forty-eight hours inform the commissioner in writing under oath what disposition they have made of the condemned material. In Brooklyn canned goods when condemned are punched by the inspector and left to be redeemed.

In some of the larger cities periodic inspections are made with a team to seize and carry away at once the goods as fast as condemned. This is done in New York among the retail dealers on the two favorite market days each week, and also on Saturday night. In Providence such raids are frequently made, but at irregular intervals. In Boston all condemned meat is tagged and is given to the "bone-man" who pays for it the regular price for such goods. Usually no compensation is made for the seizure of unwholesome provisions. In Mississippi[3] the law provides that if there is any value to the condemned goods they shall be forfeited to the county where they are offered for sale. In Massachusetts the law provides that the proceeds of their sale shall go to the owner. Sometimes a consignee from whom the goods are seized is entirely innocent as the goods may have been shipped or received in bad condition. To enable the consignee to recover from the consignor or transportation company a certificate is sometimes given stating the facts of the seizure. The form used in Providence is shown in Appendix 42.

In Cincinnati[4] the person occupying a stall in a public market from whom decayed food shall be seized shall forfeit his stall and "never thereafter be permitted to rent or occupy one." When animals are condemned at slaughter-houses they are not usually seized but are killed

[1] Newark, Sanitary Code (1888), Sec. 30.

[2] St. Louis, Ordinances (1893), Chapter 14, Sec. 358.

[3] Mississippi, Annotated Code (1892), Sec. 2105.

[4] Cincinnati, Manual of Health Department, (1898), p. 111.

and utilized by tanking under the supervision of the inspectors. In Brooklyn [1] considerable trouble was at one time occasioned in the condemnation of imported goods owing to friction between the local health department and the customs officials, but it was afterwards amicably adjusted. In Boston where much fruit is imported the co-operation of the customs officers, the transportation companies, and the health department inspectors, renders supervision of this traffic easy.

While the loss of property by seizure, and the infliction of a fine in court, has a deterrent effect, probably it has a much less effect than the fear of public exposure. Hence the following provisions of the Massachusetts law:

"The place where property condemned under this chapter is found, and the name of every person in whose possession it is found, and of every person convicted of an offence under the preceding section, shall be published in two newspapers published in the county in which the property was found or the conviction took place." [2]

Similar laws are found in Connecticut and Tennesee, but in Tennessee the names shall not be published till after conviction, and in Connecticut the parties from whom the goods were taken may add to the advertisement the name of the persons from whom they purchased. In Connecticut and in a number of other states the cost of the analysis shall be paid by the parties from whom the sample was obtained if adulterated, but by the town if the goods prove to be pure.

Besides affixing a penalty, the law in Michigan, Rhode Island, Nebraska, Iowa, Missouri, and Pennsylvania provides that no action upon any contract shall be maintained to recover upon any contract for any illegal sale of such goods.

STATUTES CONSULTED IN THE PREPARATION OF THIS CHAPTER.

ALABAMA. General adulteration, bread, liquor, Code (1897), Secs. 5321–8.
ARIZONA. General adulteration, Chapter 105 of 1887.
Meat inspection, Act of 21 March, 1895.
CALIFORNIA. General adulteration, Code (1886), Sec. 382, Chapter 76 of 1895.
Provisions, Code (1886), Sec. 383.
Candy, Code (1886), Sec. 401.
Olive oil, Chapter 47 of 1891.
Honey, Chapter 104 of 1895.
COLORADO. General adulteration, Annotated Statutes (1891), Secs. 12–14, Act of 17 April, 1893, Secs. 61–3.
Meat, Annotated Statutes, (1891), Secs. 18–21.
Liquors, Annotated Statutes (1891), Secs. 27–33.
CONNECTICUT. General adulteration, General Statutes (1888), Sec. 2648, Chapter 235 of 1895.
Vinegar, Chapters 60 and 234 of 1889.

[1] Brooklyn, Report of Department of Health, (1896), p. 41.

[2] Massachusetts, Public Statutes (1882), Chapter 58, Sec. 6.

CONNECTICUT, *Continued.*
Candy, Chapter 183 of 1895.
Molasses, Chapter 157 of 1895.
Sugar, General Statutes (1888), Sec. 2650.
Bakeries, Chapter 174 of 1897.
DELAWARE. Candy, Chapter 209 of 1895.
DISTRICT OF COLUMBIA. General adulteration, Act of 17 February, 1898.
Candy, Act of 5 May, 1898.
FLORIDA. Meat, Chapter 39 of 1891, Rules of State Board of Health, 1 April, 1896.
GEORGIA. General adulteration, Code (1882), Art. 3004.
Bread, Code (1882), Art. 4551.
Wines, etc., Laws of 1892, p. 130.
IDAHO. General adulteration, Revised Statutes (1887), Sec. 6918.
Candy, Act of 16 February, 1899.
ILLINOIS. General adulteration, bread, candy, canned goods, lard, drugs, liquors, and vinegar, veal, jelly, extracts, Annotated Statutes (1896), Chapter 38, Secs. 12-44, Act of 24 April, 1899.
INDIANA. Provisions and adulterations, various and general, Statutes (1897), Secs. 2183–94, Act of 28 February, 1899.
Candy, Act of 3 March, 1899.
IOWA. Provisions and adulterations, various and general, Code (1897), Secs. 4592, 4980–6, 4992–7.
Vinegar, Act of 9 March, 1899.
Diseased pork, Act of 12 April, 1898.
KANSAS. Adulterations, general and various, General Statutes (1896), pp. 353–358.
KENTUCKY. General adulteration, provisions, candy, honey, vinegar, lard, liquids, Statutes (1894), Secs. 1272–83, 2200, Chapter 52 of 1898.
Canned goods, Chapter 32 of 1896.
LOUISIANA. General adulterations, Act of 5 July, 1882; Provisions, Act of 3 March, 1880.
MAINE. Adulterations, general and various, Revised Statutes (1883), Chapter 128, Supplement Laws (1895), pp. 504–6.
Meat, Chapter 144 of 1895.
MARYLAND. Provisions, adulterations, general and various, Chapter 604 of 1890.
Candy, Chapter 317 of 1890.
Bakeries, Chapter 273 of 1896.
Cakes, Public General Laws (1888), Art. 27, Sec. 138.
MASSACHUSETTS. General adulteration, provisions, veal, Public Statutes (1882), Chapters 208 and 263 of 1882; 344 of 1897; and 272 of 1896.
Lard, Chapter 449 of 1887.
Poultry, Chapter 94 of 1887.
Fish, Public Statutes (1882), Chapter 56, Sec. 45.
Chocolate, Public Statutes (1882), Chapter 60.
Vinegar, Public Statutes (1882), Chapter 60; 257 of 1883; 307 of 1884, and 150 of 1885.
Candy, Chapters 333 of 1891 and 279 of 1895.
Arsenic, Chapter 374 of 1891.
Bakeries, Chapter 418 of 1896.
Inspectors, Public Statutes (1882), Chapter 58; Chapters 145 and 432 of 1892.
Canned goods, molasses and syrup, Chapter 344 of 1897.
MICHIGAN. Adulteration, general and various, Compiled Laws (1897), Secs. 4973–5029.
Provisions and adulterations, Compiled Laws (1897), Secs. 11404–29.
Wines and liquors, Compiled Laws (1897), Secs. 5403–8.
Drugs, Compiled Laws (1897), Sec. 5313.

MINNESOTA. Various adulterations, Statutes (1894), Secs. 6025, 6985 to 7022.
Candy, Chapter 204 of 1895.
Bakeries, Chapter 199 of 1895.
Poultry, Chapter 201 of 1895.
Meat, Chapter 200 of 1895, and 175 of 1899.
Food Commissioner, Chapter 295 of 1895.

MISSISSIPPI. General adulteration, Annotated Code (1892), Secs. 952, 2100–7, 2095–9, Chapter 29 of 1892.

MISSOURI. Various adulterations, Revised Statutes (1889), Secs. 3876–88.
Candy, Act of 1 April, 1891.
Chemical adulterants, Act of 11 May, 1899.

MONTANA. Adulterations, provisions, Penal Code (1895), Secs. 682–3.
Candy, Act of 22 February, 1899.

NEBRASKA. Food Commission, dairy products and vinegar. Compiled Statutes (1899), Secs. 3207–3211g.
Liquors, Compiled Statutes (1899), Sec. 3603.
Drugs. Compiled Statutes (1899), Sec. 3730.

NEVADA. Provisions, Compiled Laws (1900), Secs. 826–30.
Candy, Compiled Laws (1900), Secs. 5076–8.

NEW HAMPSHIRE. General adulteration, Chapters 39 and 269 of 1891.
Candy, Chapter 58 of 1899.

NEW JERSEY. General adulteration, Revised Statutes (1895), p. 1164, *et seq.*
Candy, Public Laws (1895), p. 279.
Coloring matter, Public Laws (1895), p. 473.
Bread, Public Laws (1896), p. 261.
Bakeries, Public Laws (1896), p. 266
Horse meat, Public Laws (1899), p. 517.

NEW MEXICO. Provisions and adulterations, Compiled Laws (1897), Secs. 1244–57.

NEW YORK. General adulteration, wine, liquors, sugar, honey, Revised Statutes (1895), p. 2418 (Public Health Law, Secs. 40–50).
Bakeries, Chapter 415 of 1898, Art. VIII.
Vinegar, Revised Statutes (1895), p. 38 (Agricultural Law, Secs. 50–3).
Veal, Chapter 491 of 1898.

NORTH CAROLINA. General adulteration, Chapters 122 of 1895 and 86 and 369 of 1899.

NORTH DAKOTA. Candy, Act of 12 March, 1897.

OHIO. Various adulterations, Annotated Statutes (1900), Secs. 4200 (-1) to (-61).
Bakeries, Annotated Statutes (1900), Secs. 4364 (-71–72).
Provisions, veal, Annotated Statutes (1900), Secs. 6928 and 6928 (-1).
Liquors, Annotated Statutes (1900), Secs. 6950, 7074, 8082–3.
Canned goods, Annotated Statutes (1900), Secs. 7072–4.

OKLAHOMA. Provisions and adulterations, Compiled Statutes (1893), Secs. 343, 2264, 2436, 2637, 2643.

OREGON. Adulterations and provisions, Annotated Laws (1892), Secs. 1978–80, Act of 21 February, 1893.
Candy, Act of 16 February, 1899.

PENNSYLVANIA. General adulteration, Acts of 26 June, 1895, and 5 July, 1895.
Flour, Act of 18 March, 1775.
Lard, Act of 6 June, 1891.
Provisions, Act of 7 May, 1855.
Candy, Act of 23 May, 1887.
Liquors, Acts of 20 March, 1860, 14 April, 1863, 3 April, 1872, 2 June, 1881.
Vinegar, Act of 5 July, 1895.
Bakeries, Act of 27 May, 1897.

RHODE ISLAND. Provisions, liquor, veal, General Laws (1896), Chapter 282.
Saleratus, General Laws (1896), Chapter 138.
Vinegar, General Laws (1896), Chapter 148.
Liquors, General Laws (1896), Chapter 151.
Candy, Act of 15 May, 1896.

SOUTH CAROLINA. Provisions and adulteration, Revised Statutes (1893), Sec. 266.
Candy, Act of 9 March, 1896.

SOUTH DAKOTA. General adulteration, Compiled Laws (1887), Secs. 6654–5, Chapter 89 of 1899.

TENNESSEE. Adulterations, Chapter 45 of 1897.
Candy, Chapter 33 of 1887.

UTAH. Inspection, Statutes (1898), Secs. 2446–50.
Drugs, Statutes (1898), Sec. 1726.
Various adulterations, Statutes (1898), Secs. 4283–90.
Vinegar, Chapter 36 of 1899.

VERMONT. Various adulterations, Statutes (1894), Secs. 4332–43.
Provisions, veal, drugs, Statutes (1894), Secs. 5073–6.

VIRGINIA. Adulterations and provisions, Code (1887), Secs. 3811–12.

WASHINGTON. Provisions, Code (1897), Sec. 7275.
General adulteration, Chapter 113 of 1899.

WEST VIRGINIA. General adulteration, Code (1899), Chapter 150, Sec. 20.

WISCONSIN. Provisions, adulterations, general and various, Statutes (1898), Secs. 4599–4601b, 4607f–i.
Dairy and Food Commission, Statutes (1894), Secs. 1410–1410d.
Bakeries, Statutes (1894), 4608i–k.

WYOMING. Candy, Revised Statutes (1899), Sec. 2223.
Drugs, Revised Statutes (1899), Secs. 2668–70.

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CHEESE.

Most of the agricultural states, and also the District of Columbia have statutes forbidding the manufacture and sale of adulterated cheese. Sophisticated cheese is not so common as artificial butter but its manufacture and sale is opposed by the same interests, and in many states it is treated of in the same statute with butter. Cheese is often defined in these statutes, usually in a manner similar to butter (see p. 364). There are three ways of dealing with the artificial cheese question.

First.

It is sometimes made an offence to manufacture or sell such cheese unless it is plainly so labeled. This is the method pursued in the District of Columbia, Illinois, Indiana, Massachusetts, Missouri, Montana, New Hampshire, North Dakota, Ohio, Oregon, Tennessee, and West Virginia. The Massachusetts law is given below.[1]

[1] Massachusetts, Chapter 352 of 1885:

"Whoever, by himself or his agents, sells, exposes for sale, or has in his possession with intent to sell, any article, substance, or compound made in imitation or semblance of cheese, or as a substitute for cheese, and not made exclusively and wholly of milk or cream, or containing any fats, oils, or grease not produced from milk or cream, shall have the words "imitation cheese," stamped, labeled, or marked, in printed letters of plain, uncondensed Gothic type, not less than one inch in length, so that said words cannot be easily defaced, upon the side of every cheese

Another act[1] fixes the penalty at $100 for first offence, and $200 for each subsequent offence for selling contrary to the above or defacing the prescribed labels.

Second.

It may be forbidden to manufacture or sell imitation cheese unless it is labeled and unless it is uncolored. The Iowa[2] oleo law after elaborately stipulating how artificial butter and cheese must be sold provides that:

"No one shall color with any matter whatever any substance intended as a substitute for butter or cheese so as to cause it to resemble true dairy products, or combine any animal fat, vegetable oil or other substance with butter or cheese, or combine with any substance whatever intended as a substitute for butter or cheese anything of any kind or nature for the purpose or with the effect of imparting to the compound the color of yellow butter or cheese, the product of the milk or cream of cows, or use, solicit orders for delivery, keep for sale, or sell, any such substance so colored and disguised as a substitute for butter or cheese; but nothing in this chapter shall be construed to prohibit the use of salt, rennet, or harmless coloring matter in making butter or cheese from such milk or cream."

A similar method is pursued in California, Colorado, Maryland, Nebraska, New Jersey, Georgia, South Carolina, and Utah.

Third.

The attempt has been made to absolutely forbid the making and sale of artificial cheese and butter. Laws like the following have been passed in several states, but though still on the statute books, have been rendered void by decisions of the United States Supreme Court:

"No person, firm, or corporate body shall manufacture out of any oleaginous substance or any compound of the same, other than the product from unadulterated milk or of cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream from the same, or of any imitation or adulterated butter or cheese, nor shall sell, or offer for sale, or have in his, her or their possession with intent to sell the same as an article of food."[3]

A fuller consideration of the above laws will be found under butter, as most of the cheese laws are identical with the butter laws.

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cloth or band around the same, and upon the top and side of every tub, firkin, box, or package containing any of said article, substance, or compound. And in case of retail sales of any of said article, substance or compound not in the original packages, the seller shall, by himself or his agents, attach to each package so sold at retail, and shall deliver therewith to the purchaser, a label or wrapper bearing in a conspicuous place upon the outside of the package the words "imitation cheese," in printed letters of plain, uncondensed Gothic type, not less than one-half inch in length."

[1] Massachusetts, Chapter 317 of 1886, Sec. 2.

[2] Iowa, Code (1897), Sec. 2518.

[3] Pennsylvania, Brightly's Purdon's Digest (1894), p. 1621, Sec. 1.

A different sort of legislation in regard to cheese is found in Kansas, Nebraska, Indiana, Wisconsin, Virginia, Connecticut, New Jersey, New York, Illinois, Minnesota,[1] Michigan, and Oklahoma. The other statutes aim at the prevention of the manufacture of artificial cheese, but these states attempt to aid the creameries in making a good article, by insisting that the materials sold to them shall be pure.

Quite a number of states have laws regulating the marking or branding the different varieties of legitimate cheese.[2] Most of these permit the manufacture of skimmed milk cheese, and require that it shall be so marked or branded. In Colorado cheese must be so marked if less than thirty-five per cent. of its total solids consists of butter fat. In Minnesota cheese shall be marked "skim cheese" if less than forty-five per cent. of its total solids is fats, in Illinois if less than forty-eight per cent. In Ohio the proportion of fats to total solids is under twenty per cent. for skimmed cheese. In Pennsylvania if cheese contains less than eight per cent. butter fat it is skimmed cheese. In Colorado the limit is fifteen per cent. fat. In Wisconsin skimmed cheese must be ten inches in diameter and nine inches high. In California cheese is to be branded "California half skim cheese" if it contains less than thirty per cent. and more than fifteen per cent. fat. In Pennsylvania cheese is to be branded "three-fourths cream" if it contains between twenty-four per cent. and thirty-two per cent. butter fat, "one-half cream" if it contains from sixteen per cent. to twenty-four per cent., and "one-fourth cream" if it contains from eight per cent. to sixteen per cent. butter fats. In Washington half skimmed cheese is that which contains from fifteen per cent. to thirty per cent. butter fats or from which only half the cream has been extracted. "Full cream cheese" is usually defined as that made wholly from pure milk from which none of the fat has been removed, but the percentage of fat required is sometimes specified. Thus in California and Washington it is thirty per cent., in Colorado, thirty-five per cent. of the total solids, in Minnesota, forty-five per cent. of the total solids, in Illinois forty-eight per cent., and in Pennsylvania thirty-two per cent.

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[1] Minnesota, Chapter 295 of 1899:

"SEC. 14. No person by himself or his agents or servants shall sell, supply or bring to be manufactured, to any butter or cheese manufactory any milk diluted with water or any other substance whatever, or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk which is sour, to any butter or cheese manufactory (except pure skim milk to skim milk cheese factories.")

[2] California, Colorado, District of Columbia, Iowa, Indiana, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Vermont, Virginia, West Virginia, Washington, and Wisconsin.

In Michigan, Minnesota, New York, Ohio, and Washington, and a number of other states, registered brands for full cream cheese may be obtained from the dairy commissioner, for which a fee is usually charged. The specifications in regard to size and character of marks are often as specific as they are in the corresponding laws for butterine. Fancy cheeses are usually exempted from the action of these laws.

BUTTER.

A few states have laws to secure the delivery of pure milk or cream to creameries. An example of one of these acts was given on page 360. There is, however, a great mass of legislation directed against the manufacture and use of butter substitutes, such as butterine or oleomargarine as it is variously called.

It cannot be maintained that the use of butterine is any more injurious to health than is the use of butter. Opposition to the use of butterine comes from the manufacturers of butter who fear that their prices will be lowered and trade injured. They can very justly demand that butterine shall be sold under its true name, but to go farther than this as is done by many of the laws, and attempt to check its legitimate sale, is a great wrong. In any event, it is an economic, rather than a sanitary question, and it is only discussed in these pages because sanitary officials are often entrusted with the execution of the laws and because the statutes relating to oleomargarine are properly to be classed with the adulteration laws.

As there can be no federal legislation in regard to adulterations of domestic products except by some subterfuge, and as the dairy interests were strong enough to successfully demand such legislation, a law was passed by Congress in 1886 ostensibly to raise revenue, but really to hinder the sale of oleomargarine. By this law manufacturers pay a tax of $600 per annum, wholesalers $480 and retailers $48. Besides these taxes the manufacturer is to pay two cents a pound. This tax is paid by stamps which are affixed to packages. The manufacturer must pack in wooden packages of not less than ten pounds, and retailers must sell from these, and all packages and all wrappers must be distinctly marked. The commissioner of internal revenue enforces the law. Oleomargarine for export does not pay the tax but must be properly labeled.

All the states and territories including the District of Columbia, except Arizona, Kansas, New Mexico, Texas and Wyoming, have butterine legislation of varying stringency. These laws, like the cheese laws treat the subject in several different ways.

First.

The attempt is made simply to secure the sale of butterine under its true name, and for this purpose it is required that it be properly labeled.

Some of these laws are not very specific. Thus in Maryland:[1]

"... no person shall mix any ... oleomargarine, suine, beef fat, lard, or any other foreign substance with any butter, cheese intended for human food ... without distinctly marking, stamping or labeling the article or the package containing the same with the true and appropriate name of such adulterant, and the percentage in which it is used for the purpose of adulteration, or enters into the composition of the article so adulterated."

The statute is not very different in Louisiana, Indiana, Missouri, and Nebraska. In Rhode Island and West Virginia the law requires that the original package shall be marked oleomargarine, in Rhode Island in letters one-half inch high, and also if sold from the tub it must be delivered in a wrapper on which the word shall be printed or stamped. In Rhode Island no attempt whatever has been made to enforce this law, yet there is little doubt that by far the larger part of the butterine is sold in accordance with its provisions. The writer has reason to believe that if its enforcement were reasonably followed up, the law would prove amply sufficient to prevent the sale of butterine as butter; but the promoters of these laws are not so anxious to prevent the fraudulent sale of butterine as they are to prevent butter substitutes from becoming popular. It is invariably required that the original packages in which butterine is received shall be plainly marked to indicate the character of the contents. Furthermore, such packages are required by law to have the revenue stamp affixed. To prevent marking with letters too small to be seen, the size is often prescribed. The Massachusetts law is shown below.[2] In Connecticut the marking must be "at all times in plain sight" and in black Roman letters not less than one inch wide and two inches long on a light ground. In Michigan the label is to be upon the top and side and burned or painted in black permanent paint in Roman letters one inch in length. In Iowa the letters are to be one inch long by one-half inch wide. In Wisconsin the marking must be in "ordinary bold faced capital letters

[1] Maryland, Chapter 604 of 1890, Sec. 40.

[2] Massachusetts, Public Statutes (1882), Chapter 56, Sec. 17:

"And in cases of retail sales of any of said article, substance, or compound not in the original packages, the seller shall, by himself or his agents, attach to each package so sold, and shall deliver therewith to the purchaser, a label or wrapper bearing in a conspicuous place, upon the outside of the package, the words "imitation butter," "oleomargarine," or "butterine," and no other words, in printed letters, in a straight line of plain, uncondensed Gothic type, not less than one-half inch in length."

not less than five line pica in size." In New Jersey the package must be marked with a black painted stripe three inches wide running around the package midway between the top and bottom, and must be branded on the outside of the cover and on the outside of the package in two places as nearly opposite each other as possible, the title in Roman letters one-half inch high and one-quarter inch broad, and "said name shall be ten inches long." In New Jersey the package must also have a label or brand showing the name and address of the manufacturer and the location of the factory.

The package in which butterine is retailed also must be labeled.

Similar provisions are found in Wisconsin, Michigan, Connecticut, Iowa, and in addition to this in Iowa, Michigan and Illinois the seller must distinctly inform the purchaser at the time of sale of the character of the goods.

In North Carolina the oleo label must give the ingredients of which the oleo is composed and also the proportions.

In addition to the United States license which all dealers are obliged to take out, some states, as Massachusetts and Connecticut, require local registration. In Massachusetts dealers are to register with the inspector of milk and pay a fee of fifty cents. In Connecticut they register with the dairy commissioner. In Mississippi dealers must pay a license fee of fifty dollars and also a vender's tax of five dollars. In Montana dealers must pay a tax of ten cents for each pound sold. In Oregon a record must be kept of all sales.

Not only must butterine packages be labeled, but in many states signs must be exhibited stating the fact that butter substitutes are sold or used.[1] These signs are to be furnished at cost by the dairy commissioner. Bakers and venders of food and keepers of hotels, boarding-houses and restaurants, if furnishing butterine or food containing it, must display similar signs substituting the word used for sold. The Iowa law also specifies that the keepers of saloons, lunch counters and places of public entertainment or any person having charge thereof or employed thereat, or any person furnishing board for members of his

[1] Connecticut, Chapter 114 of 1893, Sec. 2:

"First, the seller shall maintain in plain sight, over or next the main outer entrance of the premises where the selling is done, a sign bearing in plain black Roman letters, not less than two inches wide and four inches long, on a white ground, the words "sold here," preceded by the name of the imitation article. If the selling is done from a wagon or other vehicle, such vehicle shall conspicuously bear upon its outside on both sides of said wagon or vehicle such a sign. If the delivering is done from a wagon or other vehicle, such vehicle shall conspicuously bear upon its outside on both sides of said wagon or vehicle a sign bearing in plain, black Roman letters, not less than two inches wide and four inches long, on a white ground, the words "delivered here," preceded by the name of the imitation article."

own family or for any employees where such board is furnished as compensation or part of compensation, shall keep a card conspicuously before each table; the card to be ten by fourteen inches, white, with plain black Roman letters one inch by one-half inch, stating "Substitute for butter used here." In Michigan it is necessary to have the sign on the outside door conspicuously hung in the centre, and placed on the walls. States which have such provisions requiring labels and signs are Florida, Georgia, Indiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, Ohio, South Carolina, South Dakota, Vermont, Utah, Virginia, and Wisconsin.

It is in most states, which require the marking of butterine, forbidden to destroy the marks.[1]

As these acts deal with pure butter and butter substitutes and as penalties are usually imposed for selling goods that are not pure butter, these terms must be defined. The following is from the United States Statute:[2]

"That for the purpose of this act the word "butter" shall be understood to mean the food product usually known as butter, and which is made exclusively from milk or cream, or both, with or without common salt, and with or without coloring matter."

Second.

The restrictions upon the sale of butterine that have been given not being deemed satisfactory in several states, the sale of such substances has been absolutely forbidden. This is accomplished either directly or by a subterfuge. The subterfuge employed is a regulation of the coloring of the material. Unless artificial yellow coloring matter is added in the process of manufacture, butterine would be so nearly white as not to be attractive, and hence would find no sale. Therefore several states have forbidden the sale of butter substitutes containing artificial yellow coloring matter.[3]

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[1] Massachusetts, Public Statutes (1882), Chapter 56, Sec. 19, as amended by Chapter 317 of 1886:

"Whoever, with intent to deceive, defaces, erases, cancels, or removes any mark, stamp, brand, label, or wrapper provided for in such sections, or in any manner shall falsely label, stamp, or mark any box, tub, article, or package marked, stamped, or labelled as aforesaid, shall for every such offence forfeit to the city or town where the offence was committed one hundred dollars, and for a second and each subsequent offence two hundred dollars."

[2] United States Statutes, 49th Congress, Session I. (1886), Chapter 840, Sec. 1.

[3] Alabama, California, Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

It is worthy of note that several of these laws, like that of Iowa, while forbidding the use of coloring matter in butterine, permit it in butter.

To make butterine still more unattractive and unsaleable, it is required in South Dakota, Vermont, and West Virginia that it be colored bright pink. This last provision has however been rendered inoperative by the decisions of the federal courts.

Third.

Several states still have laws upon their statute books like that shown on page 359, which unconditionally forbid the manufacture and sale of oleomargarine, but they have not been upheld by the courts and cannot therefore be enforced.

In California, Michigan, Ohio, and Wisconsin butterine cannot be used in any penal or charitable state institution.

This brief summary is enough to show that the drastic character of these laws is not equalled by any sanitary legislation. Not only are the laws severe, but special agencies have been called into play to secure their enforcement. The state food and dairy commissions have been established largely for the purpose of preventing the sale of substitutes for butter, cheese, and lard. It is very evident that these laws aim not so much to protect the consumer against fraud as to protect dairymen in their business. It is interesting to compare the attitude of the dairy interests towards these laws which have not been particularly asked for by the public and which aim at the suppression of a harmless food, with their hostile attitude towards milk laws which are asked for by the consumer and are aimed at a most harmful adulteration.

Renovated or Process Butter.

It is possible to so treat bad or partly rancid butter by rendering and purifying, and perhaps mixing with other butter or cream or churning with milk, as to make a product which, while of poor grade, is yet saleable. Several states have laws against selling such butter without marking it as such.[1]

One of the most recent acts is that of Minnesota[2] given below. Minnesota[3] also has a law which forbids the sale of butter made under the Quinness patent (adulterated with casein) unless it is so marked.

[1] California, Illinois, Massachusetts, Michigan, Minnesota, New York, North Dakota, Pennsylvania, and Wisconsin.

[2] Minnesota, Chapter 94 of 1899:

"SECTION 1. No person, firm, corporation, agent or employe shall manufacture, sell, offer or expose for sale, in this state, any butter that is produced by taking original packing stock butter, or other butter, or both, and melting the same so that

[3] Minnesota, Chapter 141 of 1887.

MILK.

Milk is in far more urgent need of protection than any other food. It is far more liable to adulteration and pollution than any other important food and its adulteration and pollution is attended with far more serious consequences. Cows' milk is the sole food of a large number of infants, the chief food of nearly all young children and the mainstay in the nourishment of adults in sickness and convalescence. The importance of protecting this food has long been recognized and far greater efforts have been made for this than for the control of any other food material; but the ease with which milk can be adulterated, and the great profit of the operation, are obstacles which can be overcome only by the utmost vigilance in the enforcement of stringent laws; and the labor and care which are required on the part of the producer to secure a clean milk are so great that little progress has yet been made towards obtaining this much to be desired result.

The temptations for milk adulterations are so great that many yield among the producers, and also among the middle-men and peddlers, when such intervene between the producer and the consumer. An important source of trouble is the nature of the methods which must be employed to determine adulteration. The principles of chemical analysis are so little understood by men of average education that it is comparatively easy for unscrupulous milkmen and their still more unscrupulous attorneys to convince honest producers and dealers that the inspectors and chemists are unjust and perhaps unprincipled in the methods employed to secure convictions. By such persuasions the adulterators can present a powerful and often very respectable front to any effort to secure the purity of the milk supply.

The subject naturally divides itself into two parts: First, the prevention of the sale of adulterated or diluted milk, or milk poor in nutritive ingredients, and secondly, the attempt to secure clean milk, milk which is free from dirt, and particularly milk which is free from the micro-organisms, either pathogenic germs, or those which simply injure the quality of the milk. The first of these has received by far the greater attention, and for thirty years an active warfare has been waged

the butter fat can be drawn off or extracted, then mixing the said butter fat with skimmed milk, or milk, or cream, or other milk product, and rechurning or reworking the said mixture, or that produced by any process that is commonly known as boiled, process or renovated butter, unless the same is branded or marked as provided in section 2 of this act.

"SEC. 2. No person, firm, corporation, agent or employe shall sell, offer or expose for sale, or deliver to purchaser, any boiled, process or renovated butter, as defined in section 1 of this act, unless the words 'Renovated Butter' shall be plainly branded. . . . "

in the larger cities against diluted milk. The cleanliness of milk has, however, only lately received much attention, and in fact, it is only lately that the true importance of cleanliness has been understood. Comparatively little has yet been accomplished in this direction. The prevention of the sale of diluted milk will be considered first.

ADULTERATED MILK.

Legislation.

There is no federal milk law, but much has been done in the spheres of both state and municipal legislation. As in all food legislation, the state laws are the most important, though many valuable municipal regulations are found, particularly concerning cows and stables.

Some sort of milk legislation is found in all the states except Alabama, Arizona, Arkansas, Delaware, Florida, Idaho, Louisiana, Mississippi, Montana, New Mexico, North Carolina, South Dakota, Tennessee, Texas, West Virginia, and Wyoming. The fact that all of the above except Arizona and New Mexico have oleo laws directed against a far less serious form of substitution offers food for reflection. While there is no general legislation on this subject in the above states, several cities situated in them, either, as is usually the case, by virtue of their general sanitary powers, or under a special statute, have attempted to protect themselves by local regulations. Among such cities may be mentioned Wilmington, Del., New Orleans, Nashville, Memphis.

Of course it is possible to fight milk adulteration under the general laws against food adulteration, which in excellent form have been enacted in some of the states mentioned, as Tennessee and Mississippi, but it is always much more satisfactory to act under a special statute.

Milk legislation must first of all define what kind of milk shall not be sold. The following are some of the laws under which excellent work has been done:

Massachusetts, Public Statutes (1882), Chapter 57:

"SEC. 5 (as amended by section 2, chapter 318, acts of 1886): Whoever, by himself or by his servant or agent, or as the servant or agent of any other person, sells or exchanges, or delivers, or has in his custody or possession with intent to sell or exchange, or exposes or offers for sale or exchange, adulterated milk, or milk to which water or any other foreign substance has been added, or milk produced from cows fed on the refuse of distilleries, or from sick or diseased cows, or milk not of good standard quality, shall for a first offense be punished by fine of not less than fifty nor more than two hundred dollars; for a second offense by fine of not less than one hundred nor more than three hundred dollars, or by imprisonment in the house of correction for not less than sixty days; and for a subsequent offense by fine of fifty dollars and by imprisonment in the house of correction for not less than sixty nor more than ninety days.

"SEC. 9 (as amended by section 6 of chapter 352 of the acts of the year 1885, and by section 2 of chapter 318 of the acts of the year 1886, and by section 2, chapter 398,

cent. This included 647 samples which were below the standard.[1] In the District of Columbia[2] in 1897 the average of 193 samples of pure milk taken during the year was 3.84 per cent. fats, the lowest being 11.85 per cent. solids and 3 per cent. fats. The New York[3] inspectors find that "for the greater part of the year the majority of the herds supplying the city yield milk containing four per cent. and over of fat." In Newport, R. I., in 1896, the average of 38 samples (all that were taken) was 3.75 per cent. fat, or 50 per cent. above the state standard.

It is also to be remembered that prosecutions are rarely undertaken unless the samples fall one-half of one per cent. below standard, as it is unwise usually to go before a jury on a less margin.

The only real objection to fixing a milk standard is that it is manifestly unfair and unreasonable to fix a very high standard or a standard which shall be above the average of milk produced. As a matter of fact nearly all existing standards are much below the average. The result is, that unscrupulous producers and dealers, and their number is legion, soon learn to test their milk and water it down to the legal standard. This is a serious evil, but a far less evil than indiscriminate watering that would take place without regulation by means of a legalized standard.

The groundless objections that are urged against a legal standard are that it is unjust, unless fixed so low as to pass the poorest milk which any cow can produce. Such a low standard would of course be useless, for very poor milk can be obtained from poor cows poorly fed. Reasonably good cows, reasonably fed, will always yield a milk fully up to even a high standard as standards go.

It is objected that the state has no right to attempt to improve or regulate the breed of cows or quality of milk by legislation. It is the opinion of the writer that this is a perfectly proper governmental function and similar supervision has long been exerted in other directions. The state establishes the weight of a bushel of oats and by so doing it requires that a certain minimum of nutriment shall be contained. The state can as well establish a minimum for the nutritive qualities of milk.

Skimmed Milk.

The temptation to sell as pure milk, milk from which a part of the cream has been removed, is almost as great as is the temptation to sell watered milk. The sale of such milk, even as skimmed milk, is there-

[1] Cleveland, Report of Public Health Division (1899), p. 40.

[2] District of Columbia, Report of Health Officer (1897), p. 36.

[3] City of New York, Report of Department of Health (1896), p. 170.

fore prohibited in many states along with milk that is "impure, adulterated, or unwholesome." The sale of such milk is absolutely prohibited in Georgia, Indiana, Kansas, Kentucky, Nebraska, Vermont, Virginia, and Washington. In Michigan it is forbidden to sell it to creameries, and in New York it must not be sold except to skim cheese factories, except when it is properly designated, and its sale is absolutely prohibited in the City of New York. In New Jersey the absolute prohibition only applies to cities of the first class. In the District of Columbia and Massachusetts skimmed milk must not be sold if it contains less than 9.3 per cent. of milk solids exclusive of fat. In Milwaukee it is forbidden to sell skimmed milk containing less than 9 per cent. of milk solids exclusive of butter fat. In Buffalo[1] "skimmed milk must not contain a less percentage of casein and salts than that contained in unskimmed milk." In Pennsylvania skimmed milk must not contain less than 2.5 per cent. fat and must have a sp. gr. of 1.032 to 1.037. In Rhode Island, if milk contains less than 2.5 per cent. of milk fats it shall be labeled "skimmed." Usually the provisions in regard to skimmed milk define the article as milk from which "cream has been removed" or "from which the cream or any part thereof has been removed."

The following is the New York law:[2]

"Except in the counties of New York and Kings, the prohibitions contained in this article against the sale of adulterated milk shall not apply to skim milk, which is clean, pure, healthy, wholesome and unadulterated, except by skimming, sold for use in the county in which it is produced or an adjoining county, if it is sold for and as skimmed milk."

Several of the above mentioned states are engaged very extensively in the manufacturing of cheese and butter, and it is to protect the creameries chiefly that these provisions are made. In fact, the prohibition is in a number of the states, Indiana, Kansas, Michigan, Nebraska, and New York, contained in acts referring principally to creameries.

Some other states, as Maine, Massachusetts, Nevada, Ohio, Pennsylvania, South Carolina, and the cities of Baltimore and Denver, forbid the sale of skimmed milk only when it is sold as the pure article. Maine, Nevada, and South Carolina are the only ones of these states that do not go further, and specify how its character shall be indicated when sold.

Very great objection is in some quarters made to the sale of "separator" milk under the name "skimmed milk," as the former contains less than 0.5 per cent. fat. This is forbidden by the Pennsylvania

[1] Buffalo, Ordinances, Chapter 25, Sec. 92.

[2] New York, Revised Statutes (1895), p. 38 (Agricultural Law, Sec. 31).

law, but an unfavorable decision was recently given by the court.[1] It would certainly seem that separator milk ought not to be sold except under its true name.

Express directions are given as to how the skimmed milk shall be labeled in many states and cities.[2] The following is the Massachusetts law:

"No person, by himself or his agents, shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver, milk from which the cream or any part thereof has been removed, unless in a conspicuous place upon every vessel, can, or package of more than two quarts capacity from or in which such milk is sold, exchanged, or delivered the words 'Skimmed milk' are distinctly marked in plain, uncondensed Gothic letters not less than one inch in length, said marking to be in dark letters on a light ground, and to be on the vessel, can, or package itself and not upon a detachable label or tag; and unless in a conspicuous place upon every vessel, can, or package of two quarts or less capacity from or in which such milk is sold, exchanged, or delivered the words 'Skimmed milk' are distinctly marked in plain, uncondensed Gothic letters, said marking to be in dark letters on a light ground, and to be either on the vessel, can, or package itself, or upon a detachable label or tag. Whoever violates the provisions of this section shall be punished by the penalties provided in section five."[3]

In Connecticut the label must not be over six inches below the top of the can. The New Jersey law is like the Connecticut, except that it requires the label to be soldered to the can, as do the regulations of Rochester[4] and Yonkers, when the milk is sold from a can. In those cities when sold from any other vessel the letters are to be fastened thereto as the board of health or milk inspector may direct. In Chicago[5] and Milwaukee there is to be

"Conspicuously attached thereto a steel or metal plate tab on which shall be engrossed the words 'Skimmed Milk,' in large, plain, distinct letters; said steel or metal plate tab shall not be less than three (3) inches by five (5) inches in size."

In Scranton there is to be attached a printed tag. In Rhode Island, Ohio, and District of Columbia the label is to be attached above the centre of the can, and in Minnesota it is to be on top or where it can be plainly seen. The size of the letters is often specified. Usually it is 1 inch high, sometimes 1 by 1-2 inch, but in Omaha it is 2 inches. In New Haven the letters must be black. In Baltimore the words

[1] Commonwealth *vs.* Hufnal, Supreme Court, 7 January, 1898.

[2] Connecticut, District of Columbia, Illinois, Massachusetts, Minnesota, New Hampshire, New Jersey, Ohio, Pennsylvania, Rhode Island, and outside of these states in Atlanta, Buffalo, Chicago, Milwaukee, Minneapolis, New Orleans, Omaha, Rochester, and Yonkers.

[3] Massachusetts, Public Statutes (1882), Chapter 57, Sec. 7, as amended by Chapter 352 of 1885, and 398 of 1896.

[4] Rochester, Ordinances of Board of Health No. 16, Sec. 4.

[5] Chicago, Ordinances of 21 November, 1892, Sec. 19.

skimmed milk must be visible across the street. While most of the laws merely require the marking of the cans, Buffalo and Fitchburg require that the wagon shall be marked also, and in Fitchburg a special license must be obtained.

Condensed Milk.

Massachusets, New York, and Ohio are the only states which have regulations concerning condensed milk. The Massachusetts statute merely requires that every package of condensed milk shall be marked with the name of the maker, the brand and the contents.

The New York and Ohio laws are alike:[1]

"No person shall manufacture, sell, exchange, expose, or offer for sale or exchange, any condensed milk, unless the package, can, or vessel containing the same shall be distinctly labeled, stamped, or marked with its true name, brand, by whom and under what name made, and no condensed milk shall be made, exchanged, exposed, or offered for sale or exchange, unless the same be made from pure, clean, healthy, fresh, unadulterated, and wholesome milk, from which the cream has not been removed, or unless the proportion of milk solids contained in the condensed milk shall be in amount the equivalent of twelve per centum of milk solids in crude milk, and of such solids twenty-five per centum shall be fat."

A similar rule is found in Chicago.[2] In the City of New York it is forbidden to sell adulterated condensed milk.

"The term 'adulterated,' when used in this section, refers to condensed milk in which the amount of fat is less than twenty-five per cent. of the milk solids contained therein, or to which any foreign substance whatever has been added, excepting sugars, as in preserved milks."[3]

In St. Louis it is provided that condensed milk, cream and buttermilk are exempt from the provisions of the milk law. In Omaha it is permitted to sell sour milk and buttermilk.[4]

Each of the inspectors in the City of New York are instructed to obtain three samples of condensed milk each week.

Cream.

A number of the milk laws include the word cream in the provision which forbids the sale of adulterated, diseased and unwholesome milk, though in St. Louis it is expressly exempted from the action of the ordinance. Chicago has a special section for cream[5] which, after for-

[1] Ohio, Annatated Statutes (1900), Secs. 4200(–42).

[2] Chicago, Ordinance of 21 November, 1892, Sec. 26.

[3] New York, Sanitary Code (1899), Sec. 65.

[4] Omaha, Milk Ordinance, Sec. 10:

"Nothing in this Ordinance shall be so construed as to prohibit the sale of sour milk or what is known as buttermilk, provided the same is produced from pure, wholesome milk and is sold as such."

[5] Chicago, Ordinance of 21 November, 1892, Sec. 20.

and of cream taken from milk the sale of which is prohibited below a standard of 15 per cent. fat. In Denver the standard is 25 per cent. solids, of which 10.25 per cent. must be fat. In San Francisco the percentage of fat must be 3.5 per cent. in January, February, April, May, and June; 9 per cent. in March, July, August, September; 3.25 per cent. in October, November, and December. In Minnesota the statute fixes the standard of cream at 20 per cent. fat. In St. Louis it is 22 per cent. solids, of which 12 per cent. shall be fat.

In these laws, as in all adulteration laws, it is necessary to describe the material which is proscribed, the act which is forbidden, and the persons liable. The provisions in regard to the character of the milk have been considered. Among the many provisions of the different state laws defining the forbidden act may be mentioned the following: *No person shall sell, exchange, furnish, supply, distribute, deliver, expose for sale, etc., have in possession or custody with intent to sell, etc., cause to be sold, etc., deliver for domestic use, sell for human food, bring to another for domestic or potable use, or to be connected with any product of human food, transport or carry for the purpose of sale. The word knowingly is added in Georgia, Indiana, Kansas, Kentucky, Maine, Nebraska, Nevada, Pennsylvania, Virginia; and willfully in Maine. The act of adulteration is forbidden in California, Michigan, New Hampshire, and Pennsylvania.*

Many laws simply provide that "no person shall sell," and in Georgia and South Carolina the words "corporation" and "agent" are added. In Illinois, Indiana, Kansas, Kentucky, Nebraska, and Virginia "whoever" sells adulterated milk is liable to suffer the penalty. In a few states more specific terms are employed: in the Connecticut law "No person by himself or his agents or his servants;" in Rhode Island "Every person . . . for himself, or as the employee of any other person;" in New Hampshire "every person acting as the employee of another." The laws of Massachusetts, Michigan, and Ohio make use of the expression "whoever by himself or by his servant or agent or as the servant or agent of any other person."

The penalties prescribed for the violation of milk laws are often quite severe, though on the whole not so severe as for the violation of the butterine laws. Penalties may be of various kinds, as fines, imprisonment, advertising, revocation of license, and destruction of the milk.

The lowest minimum fine is $5 in the District of Columbia, the highest minimum is $50 in Ohio and Vermont. The smallest maximum is $50 in Minnesota, the highest $500 in Indiana and St. Louis. The average fine is perhaps from $25 to $100. Imprisonment is an alter-

native in the District of Columbia, Idaho, Illinois, Massachusetts, Minnesota, Nevada, New Hampshire, Ohio, Oklahoma, and Washington; the maximum is six months in Washington. The District of Columbia, Maine, Massachusetts, Ohio, New Jersey, and Rhode Island have more severe punishment for the second and subsequent offence than for the first. In Massachusetts and Rhode Island the first offence is punished by fine, but in Rhode Island the second offence and in Massachusetts the third offence must be punished by imprisonment. It is sometimes provided, as in Vermont, that the person injured by the sale of bad milk may recover damages from the seller.

The Massachusetts, New Hampshire, and Rhode Island[1] laws provide that the names of convicted dealers shall be published, and this is the practice in Chicago and some other cities. In Philadelphia the names of dealers against whom legal action is taken are published in the newspapers. In Nashville and in Warren, O., all the milk analyses are published.

In most cities a person may not sell milk without a license, and in such cases the revocation of the license after violation of the milk laws is a most severe and effectual means of punishment. It does not appear that any of the statutes which provide for the licensing of dealers, except that of New Hampshire, provide for the revocation of the license; but such is the practice in Buffalo, Chicago, Cleveland, the District of Columbia, Milwaukee, Minneapolis, New Haven, Rochester, and other cities. In Minneapolis, however, it is done under the charter,[2] and perhaps the same is true of other cities. In New Jersey a person twice convicted of violating the state law is not allowed to sell milk for two years. In Youngstown, O., the dealer also forfeits his bond of $300.

It is very often possible for inspectors acting under the general food laws to seize and destroy adulterated milk; but special provision is made for this in New York,[3] and in the regulations of Milwaukee,[4] San Francisco, Fitchburg, Chicago,[5] and other cities; and the reports show that it is the practice in Allegheny, Baltimore, Bradford, Pa., Denver, and the City of New York. In Milwaukee the inspectors must take

[1] Rhode Island, General Laws (1896), Chapter 146:

"SEC. 12. Every inspector of milk shall cause the name and place of business of all persons convicted under this chapter to be published in two newspapers published in the town or county where the offense shall have been committed."

[2] Minnesota, Chapter 413, Special Laws (1889), Sub-Chapter 4, Sec. 16.

[3] New York, Revised Statutes (1895), p. 2418 (Public Health Law, Sec. 45).

[4] Milwaukee, Ordinance, 19 October, 1891, Sec. 12.

[5] Chicago, Ordinance, 21 November, 1892, Sec. 30.

duplicate samples from all milk destroyed, and give one sample to the dealer together with a certificate of the amount destroyed. If the analysis shall show that the milk is not adulterated, it must be paid for by the city.

Licenses.

One of the most valuable means of controlling the milk supply is by licensing the dealers in that commodity. This is a very general practice in American cities. The licensing of dealers is required in the District of Columbia, Iowa, Massachusetts, Minnesota, New Hampshire, North Dakota, and Rhode Island, and is permitted by the laws of New Jersey. In Massachusetts, New Hampshire, and Rhode Island it is restricted to those cities and towns in which milk inspectors are appointed, in Minnesota to cities and towns of over 1,000 inhabitants, and in Iowa to cities of 10,000 inhabitants and over. Sometimes, as in the District of Columbia, only those who bring milk into the city are licensed. In other places, as Rhode Island and Buffalo, peddlers only are licensed, but in most cases all dealers in milk, whether peddlers or storekeepers, are licensed, though in many instances, as in Massachusetts, Minnesota, New Hampshire, and the City of New York, the two classes are treated somewhat differently. The Massachusetts law is given below.[1]

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[1] Massachusetts, Public Statutes (1882), Chapter 57, Secs. 3 and 4:

"In all cities, and in all towns in which there is an inspector of milk, every person who conveys milk in carriages or otherwise for the purpose of selling the same in such city or town shall annually, on the first day of May, or within thirty days thereafter, be licensed by the inspector or inspectors of milk of such city or town to sell milk within the limits thereof, and shall pay to such inspector or inspectors fifty cents each to the use of the city or town. The inspector or inspectors shall pay over monthly to the treasurer of such city or town all sums collected by him or them. Licenses shall be issued only in the names of the owners of carriages or other vehicles, and shall for the purposes of this chapter be conclusive evidence of ownership. No license shall be sold, assigned, or transferred. Each license shall record the name, residence, place of business, number of carriages or other vehicles used, name and residence of every driver or other person engaged in carrying or selling said milk, and the number of the license. Each licensee shall before engaging in the sale of milk cause his name, the number of his license, and his place of business to be legibly placed on each outer side of all carriages or vehicles used by him in the conveyance and sale of milk, and he shall report to the inspector or inspectors any change of driver or other person employed by him which may occur during the term of his license. Whoever, without being first licensed under the provisions of this section, sells milk or exposes it for sale from carriages or other vehicles, or has it in his custody or possession with intent so to sell, and whoever violates any of the provisions of this section, shall for a first offence be punished by fine of not less than thirty nor more than one hundred dollars; for a second offense by fine of not less than fifty nor more than three hundred dollars; and for a subse-

Besides the general laws providing for the licensing of milk dealers, a number of cities have such provisions in their charters, or are authorized to do it by special acts, as Baltimore[1] and New Haven. Again many cities control their milk supply by virtue of their grant of general sanitary authority, even if milk is not specifically mentioned in the enabling act. Among such cities are Buffalo, Cincinnati, Cleveland, Nashville, New York, and Rochester.

The authority which grants the license varies in different localties. In Iowa the whole matter of milk control, including the issuing of licenses, is in the hands of the state dairy commissioner. The New Jersey laws permit the common council or other governing body of cities and towns to provide for licensing as they may decide best. In Massachusetts, New Hampshire and Rhode Island, where milk inspectors are in most cities independent officers, elected by the city council, the licensing of dealers is left to the inspectors. In most cases it is the sanitary authority which issues milk licenses. Sometimes it is the board of health or department of health, as in Allegheny, Atlanta, Detroit, Louisville, New Haven, New York, Pittsburgh, and Rochester. In the District of Columbia, Chicago, Denver and Omaha, it is the health commissioner. In Cleveland it is the director of police of which department the health bureau is a part; in Buffalo, the mayor, in Minneapolis, the city council, in Scranton, it is the secretary of the board of health, and in Cincinnati and other Ohio cities, the health officer.

The recent movement of health officers to secure good milk requires the control, or at least inspection of the conditions under which the milk is produced and hence a knowledge of the producers is required. The tracing of adulteration and the following up of outbreaks of disease presupposes a knowledge of the location of the producer of every can of milk. To secure the information necessary for a proper control of a milk supply many cities require the applicant for a license to furnish the data required for such control. Among the cities which do this may be mentioned Buffalo, Chicago, Cleveland, Denver, District of Columbia, Minneapolis, New Orleans, and the City of New York,

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quent offense by fine of fifty dollars and by imprisonment in the house of correction for not less than thirty nor more than sixty days.

"Every person before selling milk or offering it for sale in a store, booth, stand, or market place in a city or in a town in which an inspector or inspectors of milk are appointed, shall register in the books of such inspector or inspectors, and shall pay to him or them fifty cents to the use of such city or town; and whoever neglects so to register shall be punished for each offense by fine not exceeding twenty dollars."

[1] Maryland, Chapter 53 of 1894.

and some smaller cities, as Asbury Park, N. J., Nashua, N. H., Lynn, Warren, O., and Yonkers. A committee appointed by the Massachusetts Association of Boards of Health which gave the question of milk supply most careful study reported this as the first step necessary for a proper control.[1] Most of the cities mentioned require a written application usually on blanks furnished by the city. Forms of application are shown in Appendices 43–45.

In the District of Columbia the application must be "accompanied by such detailed description of the dairy farm where said milk is produced as said health officer may require and by a sworn statement as to the physical condition of the cattle supplying the milk." In Cleveland and Denver the information derived in this way is to be recorded in a book which is to be open to the inspection of the public. In Cleveland[2] and Louisville the license is granted only on condition "that no milk shall be sold contrary to the provisions of the preceding section," viz.: the rules against adulteration, etc. In Baltimore, Colorado Springs, and Lynn, a license is not issued until the premises of the producer have been inspected.

In Minnesota all peddlers or venders of milk in cities must make quarterly reports to the state dairy commissioner on blanks furnished by him of the amount of business transacted. In Iowa there is a similar law. In Asbury Park[3] milk dealers are required to furnish to the board of health when requested a list of persons from whom they buy, and also of their customers.

In most state and city regulations it is provided that licenses shall be issued annually, though in the City of New York and a few small places this does not appear to be the case. It is certain that licenses to be of much value to the city must be renewed annually, or else, as in New York, the licensee must be required to give notice at once of any change in the information given on the blank; and the licensees must be held strictly to this.

In regard to fees for the licenses, three methods may be pursued; no fee may be charged; the fee may be nominal, or it may be made a source of revenue. In Atlanta, Baltimore, Cincinnati, District of Columbia, Minnesota, Providence, Rochester, Yonkers, and a few other places no fee is charged. In Hartford it is twenty-five cents. In Massachusetts, New Hampshire, and New Haven it is fifty cents. In Cleveland, Denver, Iowa, and Minnesota it is one dollar. In Buffalo it is two

[1] Journal of Massachusetts Association of Boards of Health, December, 1897, Vol. VII., p. 119.

[2] Cleveland, Ordinances, Chapter 30, Sec. 551.

[3] Asbury Park, N. J., Sanitary Code (1897), Secs. 7 and 8.

dollars for each vehicle and three dollars for each dealer who brings milk into the city. In Youngstown, O., the fee is one dollar and twenty-five cents (twenty-five cents for the clerk). In Chicago and Omaha the fee is ten dollars; and in Fort Wayne, Ind., twenty-five dollars, but in Omaha:

"Any person owning less than ten (10) cows and delivering milk by hand, or from his or her residence, shall pay a license fee of one dollar ($1.00) for each cow, and any person selling milk from any store or other place of business, and selling less than ten gallons per day, shall pay a license fee of five dollars ($5.00).

In Chicago the amount received for milk licenses goes to the laboratory fund. In that city the rule about licensing provides:

"That this section shall not apply to private persons who own one or more cows and who sell milk therefrom to their neighbors or customers by peddling the same by hand."

Iowa, Buffalo, Chicago, Denver, and Omaha require that a license shall be taken out for each wagon. Examples of licenses are shown in Appendix 46.

For the purpose of the easy identification of licensees it is usually provided that the wagons used by them shall be marked in some conspicuous and distinctive manner. Such a requirement is found in the laws of California, Illinois, Massachusetts, Minnesota, New Hampshire, Rhode Island, and in Pennsylvania in boroughs of over 1,000, but is usually dealt with in the local regulations of cities. Almost all of these regulations require that the name of the licensee be placed on the wagon, though in one instance "City Milk License" with the date is all that is required[1] and in Chicago the name is not required. Massachusetts, New Hampshire, Buffalo, Chicago, Denver, District of Columbia, Fitchburg, Minneapolis, and some other cities require the number of the license. California, Massachusetts, Minnesota, and New Hampshire require that the place of business as well as the name shall appear, while Illinois, Atlanta, District of Columbia, New Orleans, and Pennsylvania cities of the second class require the name of the dairy or the place from which the milk is obtained.

Most of the rules require that the lettering shall be "legible" or "conspicuous," or "plain," and some, as Denver that it shall be kept so. When milk is not sold from a wagon, but from a can carried by hand, or is sold in a store, it is sometimes required that the can shall be marked. The Rochester rule is given below.[2] In other cities than

[1] Little Falls, N. Y.

[2] Rochester, Ordinances of Board of Health, No. 16, Sec. 4:

"Such license number shall be painted on such wagon or vehicle in numbers not less than three inches in height, in what is known as Gothic characters, and shall be

Rochester the size of letters or figures is specified. Sometimes, as in New Orleans, like Rochester it is three inches. In Atlanta it is four inches, Cincinnati two inches, Colorado Springs and Denver one and one-half inches. In Fitchburg the number "must be painted on both sides of the wagon in letters two inches in length and one and one-half inches in width, and in some color contrasting with that of the wagon." [1] Plain, satisfactory, and uniform lettering is secured in Chicago, Milwaukee,[2] and Omaha[3] by requiring that the licensee shall exhibit on both sides of his wagon a tin sign furnished by the city free of charge.

Besides lettering the wagons several cities provide that the license shall be kept posted in the wagon at all times. This is the rule in Denver, Colorado Springs, Fitchburg, and Scranton, and in Fitchburg the licenses for stores which in Massachusetts is different from that for wagons, must be kept posted in the stores, and a similar rule is in force in Minneapolis and Milwaukee, in which city the notice is furnished by the inspector.

It is a great help to the inspector to have a sign of some sort exhibited in stores showing from what dealer or dairy the milk was obtained; hence such a regulation is found in a number of cities, as Buffalo, the District of Columbia, Cincinnati, Cleveland, and Louisville. In the District of Columbia it must be posted in bakeries as well.

Each of the inspectors in the City of New York is instructed to procure three samples of cream each week, but as there is no legal standard for cream, the samples are tested for coloring matter and preservatives only. They vary much in their fat contents.[4]

Inspection.

Milk laws are of little value unless active measures are taken to enforce them. There must be a constant supervision of the dealers and inspection of the milk. This is so important that a number of states in their food, milk or dairy legislation have provided for it. Sometimes

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placed on such wagon or vehicle under the direction of the board of health or its milk inspector; and in case milk is sold from cans or vessels, where no wagon or other vehicle is used, then the license number of the person, persons, or corporation selling, or offering for sale such milk, shall be placed in a conspicuous place on such can or vessel, in such manner as to style of number and method of fastening the same on such can or vessel as to meet the approval of the board of health or its milk inspector, or, if such milk is sold, or exposed for sale within a store or house, then such license number shall be exposed in some conspicuous place in said store or house."

[1] Fitchburg, Rules and Regulations, Board of Health (1897), p. 32, rule 7.

[2] Milwaukee, Ordinance of 23 October, 1891.

[3] Omaha, Milk Ordinance, Sec. 4.

[4] New York, Report of Board of Health (1896), p. 172.

this control is exercised wholly or partially through state agencies. In some states, as in Massachusetts and Maryland, the state board of health through its agents looks after the milk as well as other foods. Usually the work of the state inspectors is confined to the smaller cities and villages, as most of the larger communities are provided with their own local inspectors. Other states have dairy or dairy and food commissioners who perform similar functions. In Iowa, Washington, and Wisconsin the commissioner apparently has full control of the milk supply, there being no local inspectors except in Milwaukee. In Iowa the dairy commissioner is authorized by statute to appoint an agent in each city of over 10,000 inhabitants, to collect from each dealer not more than four times a month, samples of milk offered for sale. The compensation is three dollars for each day actually employed. There are thirteen such cities in Iowa where 500 dealers supply milk to 40,000 families. There is one agent in each city appointed by the state dairy commissioner.[1] In Pennsylvania, Ohio, and Michigan the dairy commissioner, and in Pennsylvania the state board of agriculture look after the local milk supply to some extent.

The chief need for milk inspection is in the cities, and usually the cities appoint their own inspectors. Doubtless it is possible under a grant of general sanitary legislative power for municipalities to provide for milk inspection, even though no direct authority is given in the general statutes or in their charters. There is no legislation providing for the appointment of milk inspectors in Ohio, Illinois, Nebraska, New York, Missouri, Tennessee, and Kentucky, yet many of the important cities in those states have appointed milk inspectors and adopted rules for the control of the milk supply, though there is no specific authority in their charters for them to do so.

The importance of milk inspection has induced several states to legislate concerning it.[2]

The Maine, Massachusetts, New Hampshire, and Rhode Island laws are much alike. The following is that of Massachusetts:[3]

"The mayor and aldermen of cities shall, and the selectmen of towns may, annually appoint one or more persons to be inspectors of milk for their respective places, who shall be sworn before entering upon the duties of their office. Each inspector shall publish a notice of his appointment for two weeks in a newspaper published in his city or town, or, if no newspaper is published therein, he shall post up such notice in two or more public places in such city or town.

"Such inspectors shall keep an office and shall record in books kept for the pur-

[1] Iowa, Report of Dairy Commissioner (1897), p. 136.

[2] Among these are Colorado, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, Pennsylvania, and Rhode Island.

[3] Massachusetts, Public Statutes (1882), Chapter 57, Secs. 1–2, as amended by Chapter 318 of 1886.

pose the names and places of business of all persons engaged in the sale of milk in their city or town. Said inspectors may, with the approval of the mayor or the selectmen, employ suitable persons to act as collectors of samples, who shall be sworn before entering upon their duties. Said inspectors, or the collectors employed and qualified as aforesaid, may enter all places where milk is stored or kept for sale, and all carriages used for the conveyance of milk, and the said inspectors or the collectors may take samples for analysis from all such places or carriages, and at the same time a portion of each sample so taken, shall, if the person taking the same be requested so to do, be sealed and delivered to the owner or person from whose possession the same is taken and a receipt given therefor to the person taking the same.

"The inspectors shall cause the samples of milk so taken to be analyzed or otherwise satisfactorily tested, the results of which analysis or test they shall record and preserve as evidence. The inspectors shall receive such compensation as the mayor and aldermen or selectmen may determine."

As in Massachusetts, so in Maine, the law is mandatory, but only for towns of over 3,000 inhabitants. The other state laws are only permissive. The Minnesota statute which was enacted in 1895 gives authority to appoint inspectors of milk, dairies, and dairy herds.

With the exception of Colorado and New Jersey all of the laws above referred to place the appointment of milk inspectors in the hands of the city council or similar body rather than in the hands of the board of health. In Colorado the statute gives the power to the board of health, and in New Jersey the cities may so provide if they so desire. It is an important question whether the control of the milk supply should be under the jurisdiction of the board of health or confined to an independent officer. The state legislators have evidently thought best to make the milk inspector an independent officer appointed by the city council. The cities have thought otherwise, for by special acts the cities of Boston and Lynn have, within a few years, succeeded in placing their milk supply under the control of the board of health, and in those states in which the statutes do not provide how the inspectors shall be appointed they are usually in the board of health. This is true of Baltimore, Buffalo, Chicago, Cincinnati, Cleveland, District of Columbia, Minneapolis, Nashville, New York, Omaha, Philadelphia, Pittsburgh, Rochester, and San Francisco. The efficiency of some of these cities in looking after their milk supply would indicate that such an arrangement is satisfactory. If the sanitary condition of the cows, dairies, wagons, vessels, etc., is to be controlled at all, it would seem that the health department would have better facilities for doing it than an independent officer. A recent discussion by health officers in Massachusetts[1] brought out the fact that while milk inspectors were appointed by the councils, rules for the control of dairies must be made by boards

[1] Journal of the Massachusetts Association of Boards of Health, Vol. VII, p. 116.

of health, and it appeared that unless the milk inspector was also appointed by the board of health there might easily be an unfortunate conflict. Effort is made in some Massachusetts cities, as Lowell and Fitchburg, to secure co-operation between the milk inspectors and the board of health, but such efforts may not always be successful.

Several of the inspection laws, as those of Massachusetts, New Hampshire, Rhode Island, and Wisconsin, give the inspectors the right to enter premises and vehicles for the purpose of taking samples, and similar provisions are found in municipal ordinances.

For successful milk inspection three things are to be done; first the milk must be inspected in the hands of producers and dealers; second, the samples must be tested and analyzed; third, the offenders must be prosecuted. In many cities all these things may be done by one and the same person, usually the milk inspector, but perhaps by the food inspector, the chemist or the health officer. Other cities, particularly the larger cities, have found it advisable to separate these functions among different officers. To consider the last first, it may be said that in the majority of places the police or law officers actually see to the preparation of the evidence and the presentation of the cases for prosecution, or else this work is done under their immediate supervision. The milk acts do not usually refer to this matter as it is covered by other laws, but in Rhode Island the inspector is empowered by the act to prosecute, and in the District of Columbia and Hartford it is made the duty of the city attorney, and in Detroit of the chief of police.

The successful prosecution of milk adulterators presupposes the chemical analysis of the suspected milk. Hence milk inspectors are usually chemists or else have a chemist under them, or refer directly to the municipal chemist. Thus in Baltimore, Brooklyn, Buffalo, Chicago, Cleveland, Milwaukee, the City of New York, and San Francisco, the inspection of milk is made a part of the general food inspection, and in nearly every instance that division or bureau is presided over by a chemist, and in every instance has a chemist in its employ. In New Orleans the city chemist looks after the milk supply. In other cities, as Atlanta, Newark, Pittsburgh, and doubtless many smaller places, the milk inspector is simply an inspector and collector of samples, and hands over the samples to the city chemist for analysis. When the milk inspection is not merged in a division of food inspection, by far the most common way is to require the milk inspector to be a chemist skilled in milk analysis.

While milk inspectors who are trained chemists do often make all their own inspections and collect their samples, yet it hardly seems

wise to employ a skilled person for such service, and in large cities it is necessary for the chemist to have assistants to collect samples.

The appointment of collectors by the inspectors is provided for in the Massachusetts and Rhode Island laws, and such officers have been appointed elsewhere, as in Chicago, Milwaukee, New Orleans, New York, Philadelphia, and San Francisco. In Detroit the police, in Cleveland the sanitary police, and in Milwaukee sanitary inspectors are sometimes detailed to collect samples. In Chicago the inspectors wear the badge and insignia of the police (furnished at their own expense). It might be expected that this would identify them too readily to the milk dealers, thus giving one with poor milk a chance to get out of the way.

Sometimes, as has been said, the milk inspection in the larger cities is made a part of the general food inspection. In other cities the milk inspector is sometimes a food, meat or vegetable inspector as well. This is true of a number of the Massachusetts cities, and Allegheny, Atlanta, Columbus, Evansville, Newark, Salt Lake City, Scranton, and Youngstown, O. In San Antonio and Hartford the sealer of weights and measures is the milk inspector. In Lancaster, Penn., and Memphis the health officer makes the tests of the milk and is practically the inspector. In Terre Haute, Ind., the sanitary inspector must be a skilled milk inspector, and in Warren, O., the sanitary policeman is the milk inspector. In Brookline and Pittsfield, Mass., the milk inspector is also the veterinarian.

The following is a list of cities with the officials controlling the milk supply and their salaries:

City.	Number of Inspectors.	Annual Salary.
Baltimore	2 milk inspectors	1,000
Boston	1 chemist	3,000
	1 chemist	2,400
	3 collectors per day	3
Buffalo	2 milk inspectors	1,000
Chicago	1 milk inspector	1,500
	6 milk inspectors	900
Cincinnati	1 chemist	1,200
Denver	1 chemist	900
Hartford	1 chemist	1,000[1]
Milwaukee	1 chemist	1,200
	1 milk inspector	800
Minneapolis	1 bread and milk inspector	900
	1 veterinarian	1,000
	2 dairy inspectors	1,000
Newark	1 milk inspector	1,000
New Orleans	1 milk inspector	1,300

[1] Is also sealer of weights and measures.

City.	Number of Inspectors.		Annual Salary.
New York (Borough of Manhattan)	1	milk inspector	1,500
	6	milk inspectors	1,200
Philadelphia	1	chief milk inspector	1,900
	4	assistant milk inspectors	1,020
	5	collectors	720
Pittsburgh	1	chemist	1,500
	1	collector	1,200
Providence	1	chemist	2,000
	1	chemist	800
	2	collectors	per week 15
Rochester	1	chemist	1,200
	1	collector	2,100
	1	collector	600
St. Louis	1	milk inspector	1,500
	2	dairy inspectors	2,100
St. Paul	4	milk inspectors	900
Syracuse	1	milk inspector	1,200

For salaries of food and milk inspectors see also p. 344.

The methods employed in supervising the milk supply vary in different cities, owing to the differences in the source of supply and manner of distribution. In cities containing up to 100,000 inhabitants, and sometimes in larger cities surrounded by an easily accessible agricultural country, the milk is chiefly distributed directly to the customers by the producer. The farmer keeps his own cows and sells the milk to the consumer, delivering it from his wagon which is driven to the city in the early hours of the morning. Sometimes he may buy some milk from his neighbors, and occasionally a country dealer may buy all the milk which he delivers to his customers. In Providence about four-fifths of the milk is thus brought in on wagons from a distance of a dozen miles or less. In the larger cities the milk supply must necessarily come chiefly from a longer distance, and this has necessitated its transportation by railroad and the development of the middleman. Boston[1] and New York[2] are excellent examples of this class of city. In Boston about three-fourths of the milk is railroad milk and in New York a much larger proportion. In Boston some of the milk comes a distance of 140 miles, and in New York 300 miles. The transportation companies use ice freely in specially constructed cars; the milk usually arrives in the city in good condition, that is, it is not sour. This milk is purchased of the farmers by middlemen who have depots in the city at which it is received. In some cities the business has been much con-

[1] Milk supply of Boston and other New England cities. Bulletin 20. Bureau of Animal Industry, U. S. Department of Agriculture, 1898.

[2] New York, Report of Department of Health (1896), pp. 90-94.

solidated and is in the hands of a few persons who distribute the milk from very extensive establishments. These middlemen sell to the retail dealers who distribute it to their customers each morning. The milk is usually at least thirty-six hours old before it reaches the consumer. Milk is also sold from stores, the amount sold in this way differing greatly in different cities. Usually the amount is greater in larger than in smaller places. Generally some milk is produced in the city itself. Usually the amount is not large. In New York it is about five per cent. of the total supply; in Baltimore ten per cent.: more than is brought in on wagons.

In those towns and cities where milk is distributed from wagons by the producer directly to the consumer, with perhaps the intervention of a few stores, the problem of the inspector or collector, for usually there is only one for such a town, is comparatively simple. He has to be on hand early in the morning to intercept the milkmen on their way from the country to the city, and later to visit the stores. In the larger cities it is necessary not only to inspect the milk on the wagons and in the stores, but also to look after it while it is in the depots of the middlemen and as it is received from the railroads. The relative attention given to these different parts of the business varies, as the experience in different cities has shown, that one part or another is the greatest seat of danger. In Boston, Chicago, New York, and Philadelphia comparatively little attention is given to the receiving depots, while the reverse is true in Baltimore, Cleveland, and San Francisco. In San Francisco the milk comes into the city through four stations and every can is tested. The inspectors claim that subsequent tests from the wagons in the city show that the milk is not adulterated by the dealers after it leaves the station. In Baltimore the incoming milk is tested at six stations. In New York, Chicago, and Denver most attention is given to stores: in the first named city seven out of eight inspectors are occupied mostly in this work, and only occasionally visit receiving depots, and one only is detailed to look after the milk as it is delivered from wagons. In the large cities of Brooklyn, Chicago, New York, and Philadelphia, where there are several inspectors, each inspector is usually assigned to a certain district of the city, and in Brooklyn and Chicago the assignment is frequently changed. Usually inspectors make their rounds on foot, but in Providence, owing to the speed with which certain milkmen drove out of sight at the collector's approach, the latter was furnished a horse and buggy, which he uses in his work. In Providence and Newark the inspectors direct their attention chiefly to the wagons of the peddlers.

The inspectors' and collectors' outfit and duties vary according as

different methods of testing are relied upon. There are two main methods of testing milk; one is by the use of the lactometer to determine its specific gravity, and the other is by chemical analysis which determines the percentage of solids and of fat.

A practical difficulty in the use of the lactometer is that it is only reliable at the temperature for which it is graduated. If the milk is above or below that temperature the readings will not be correct. Hence this instrument should always be used in conjunction with a thermometer, and the best lactometers have a thermometer blown in the glass with the graduation above that of the lactometer. Lactometers are usually intended to be used at a temperature of 60°, and if the milk is above or below that, a correction must be made by means of a table which has been prepared for that purpose, or for ordinary usage one degree of the board of health lactometer, so-called, must be subtracted from every three degrees which falls below 60° or added for every three degrees above. Even this correction is not reliable for over 10° of temperature either way, and it is more satisfactory if the milk is within 5° of 60°. One great objection to the use of the lactometer is that while the removal of cream raises the specific gravity the addition of water lowers it so that the skillful milkman by employing both processes can produce with much profit to himself a fluid with the specific gravity of unaltered milk. The watery blue appearance of this watered and skimmed milk would betray its character to the skilled inspector. Special instruments have been devised to supplement the skill of the observer in detecting the removal of cream. Among such that have been to some extent used by milk inspectors are the pioscope and lactoscope.

The former of these consists of a disc of hard rubber with a depression in the centre and the rim surrounding this painted in segments to represent cream and milks of various degrees of richness. A drop of milk is placed in the centre and covered with a glass to give a uniform thickness. The color of the milk is then compared with standard colors on the rim. The pioscope is used some in San Francisco. The lactoscope is used somewhat in Philadelphia and a few other cities. Neither of the two instruments is used nearly as much as the lactometer.

Formerly the lactometer was much relied upon in milk inspections and was used exclusively in many large cities, and conviction on its evidence was secured in New York in 1878 in the celebrated "milk cases"[1] and more recently in Baltimore.[2] The difficulties in the use of the lactometer have been referred to, the most important being that except in the hands of a skilled and careful observer, much watered

[1] The People *vs.* Daniel Schrumpf, Supreme Court, April term, 1878.

[2] John W. Deems *vs.* Mayor and City Council of Baltimore, 1894.

milk will be passed as pure, but the skill of an inspector is very uncertain ground for test cases in courts before a jury. The fact that few states or cities have fixed the standard for milk in terms of specific gravity still further limits the use of this instrument, for it can only be used successfully for purposes when the standard is fixed in specific gravity degrees. A specific gravity standard is established in Michigan, Oregon, Pennsylvania, cities of the second class, Baltimore, New Haven, New Orleans, San Francisco, and San Antonio. Its showings may be waived as a basis for testing milk as is done in New York and Baltimore, and in Baltimore it is the sole reliance in such cases. But the chief use of the lactometer is to furnish a rough test to guide the inspector. If he finds that the readings indicate a quality below the standard he takes a sample for chemical analysis; if otherwise he passes on to another specimen. In this way it is claimed much labor is saved the chemist and a much larger amount of milk can come under the cognizance of the inspector. In the majority of cities the inspectors are provided with means for using the lactometer, and use it for taking samples of suspected milk.

The following instructions as to the use of the lactometer are given by the board of health in New York city:[1]

"To test for water the lactometer can be used as follows: Stir the milk to be tested so that a fair sample can be taken. Warm or cool enough milk to 60° Fahrenheit to fill the testing cylinder. Insert the lactometer in the milk in the testing cylinder, being careful not to wet that part of the stem above the milk and observe where it floats. Pure milk will not fall below the 100 mark on the lactometer at 60° temperature. It must be remembered that skimming the milk will make the lactometer float higher, and the addition of water or cream may make it sink lower than 100. But if the appearance of the milk upon the lactometer is noted, no one can mistake watered milk for milk to which cream has been added, nor pure milk for milk from which the cream has been removed, as in skimmed milk. In other words, if the lactometer floats below 100 and the milk looks thin, water has been added. If it floats above 100 and the milk looks thin, it may be skimmed, or skimmed and watered. But if it floats above 100 and looks creamy and yellow and sticks to the glass, you can be reasonably sure that it is pure. Good average milk will indicate about 100 on the lactometer at a temperature of 60 Fahrenheit, and show about fourteen per cent. of cream by the cream test."

The method of milk inspection by testing as it is applied in Jersey City in New York city is:[2]

"Each inspector is provided with a suitable bag containing a lactometer and thermometer, and a wide-mouth glass jar. After having been tested as to their accuracy by the chemists, and the specific gravity of the milk as shown by the lactometer, the date tested, the name of the chemist who tested the lactometer, and the number of the inspector to whom it is issued are recorded. The inspector is required to test the milk of all persons

[1] — of New York Report of the Department of Health (1896, p. 111).

[2] — of New York Report of Department of Health (1896, p. [illegible]).

"He is also provided with an inspection book, which is numbered with consecutive numbers (see diagram), indicating the proper number of the inspection:

26

Date..... Hour.....
Street and Number.....
Name of Owner.....
Business.....
From whom purchased.....
Number of Quarts sold Daily.....

Can No.	Amount of Contents.	Lactometer.	Temperature.	Lactometer at 60 deg.	Appearance.	Odor.	Taste.
1							
2							
3							
4							

No. of inspection, N 1626.
Marks on Cans.

REMARKS.

—also a stub-book numbered with consecutive numbers of milk samples taken, as follows:

HEALTH DEPARTMENT, CITY OF NEW YORK.
DIVISION OF FOOD INSPECTION AND OFFENSIVE TRADES.

Date.....
No. of Inspection.....
Inspector.....
Witness.....
Name of Owner.....
Address.....
Quarts Destroyed.....
Adulteration.....
Sample No.....

HEALTH DEPARTMENT, CITY OF NEW YORK.
DIVISION OF FOOD INSPECTION AND OFFENSIVE TRADES.

Date.....
No. of Inspection.....
Inspector.....
Witness.....
Name of Owner.....
Address.....
Quarts Destroyed.....
Adulteration.....
Sample No.....

—as required by Chapter 338, Laws of 1893.

"Six-ounce bottles for samples to be delivered to vender, both sides of this bottle perforated with a small hole to permit sealing with wire and lead seal; wire and seals and brad-awl and sealing iron, this latter having 'Health Department, N. Y.' on reverse of die, and the distinguishing letter of the inspector, as A, B, C. etc., on the obverse side.

"Four-ounce wide-mouth bottles for milk samples to be delivered to Department Chemist.

"A testing cylinder to hold the milk under examination, towels, labels, etc. Each inspector is required to wear his official badge at all times when on duty.

"The cylinder used to contain the milk under examination is made in the following shape:

"The tin cup at the bottom holding a little alcohol, this enables the inspector to readily warm the milk to sixty degrees Fahrenheit by pouring a little alcohol in this cup, igniting the same and stirring contents, while burning, with the thermometer, until the desired temperature is attained.

"Chapter 338 of the Laws of 1893 requires every inspector taking a sample of milk for analysis to deliver to the vender or his representative a sealed sample and in the presence of a witness.

"In order to comply with this law, it has been found convenient to have an officer detailed from the sanitary police, to accompany the inspector and so act as the witness and generally assist."

Other states and cities besides New York have regulations in regard to sampling milk. In Massachusetts, Vermont, and Washington duplicate samples must be furnished the dealer if asked for, but in Massachusetts[1] if such a duplicate sample is not given, the evidence derived from the sample taken shall be received in court. In Vermont[2] the sample must be taken in the presence of the dealer and a disinterested witness, and must be labeled and the label signed by the witness. A witness is also required in Milwaukee, and in the District of Columbia two witnesses. In Massachusetts[3] a recent law requires that the analysis must within ten days be sent to the person from whom the sample was obtained.

In Chicago the inspector on taking a sample makes out two slips, one of which is kept in the office, and the other is given to the dealer. The latter slip is shown in Appendix 47. If the dealer brings this to the office, which he usually does, he can have noted upon it the results of the analysis.

In Chicago each inspector carries a case of twenty-four half pint bottles. In Detroit seven ounce square bottles are used. In Massachusetts the counterfeiting of the inspector's seal is forbidden.[4]

In New York City "The inspector, before the examination of the milk, either in a store or upon a cart, as in the course of delivery to

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[1] Massachusetts, Chapter 318 of 1886, Sec. 3.

[2] Vermont, Statutes (1894), Secs. 4329–30.

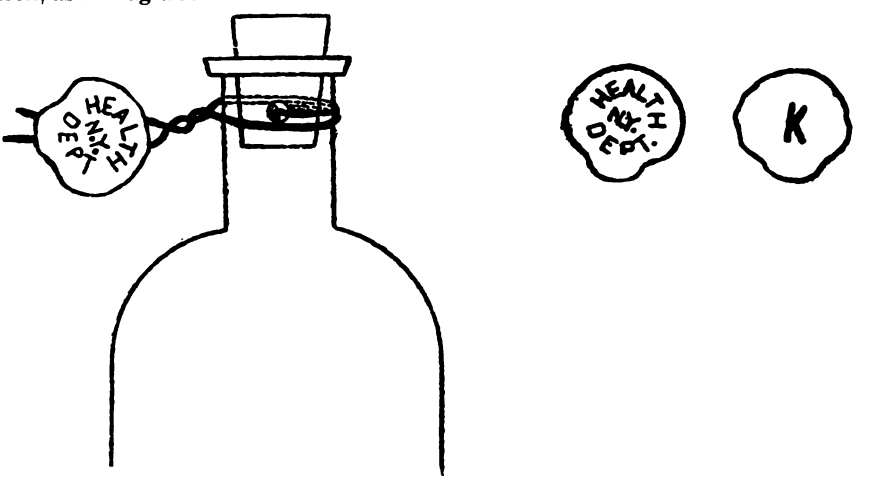
[3] Massachusetts, Chapter 169 of 1899.

[4] Massachusetts, Chapter 398 of 1896, Sec. 3:

"Whoever makes, causes to be made, uses, or has in his possession any imitation or counterfeit of any seal used by any inspector of milk, collector of samples, or other official engaged in the inspection of milk, and whoever changes or in any way tampers with any sample taken or sealed as provided in section two, shall be punished by a fine of not less than one hundred dollars and by imprisonment in the house of correction not less than three nor more than six months."

customers, ascertains, first, if the owner has a permit to sell milk, and such facts as are necessary to fill in the blanks on his inspection books, and also such information as might become necessary should subsequent legal steps be taken. Having recorded such information on his inspection book, he next proceeds to obtain the lactometric standing as follows: "In order to take a fair sample, the milk in the vessel from which the sample is taken must be thoroughly mixed." This is doubtless the usual practice with inspectors, but it rarely receives legislative notice as it does in the District of Columbia, where it is provided[1] that "such sampling shall be made according to the Babcock method, to wit: dumping the milk from one can to another not less than twice before sampling." In New York[2] the inspector after taking his sample makes the lactometer test.

"If from this examination he believes the milk to be adulterated by the addition of water or by the removal of part of the cream, or should the taste, odor, etc., indicate some other form of adulteration, the six-ounce bottle, having holes through the neck, is filled from the testing cyclinder, the cork inserted, a wire passed through the holes in the neck of the bottle and the cork, then twisted around the bottle, the blank lead seal slipped over the ends of wire and sealed with sealing iron, as in diagram.



"Upon the bottle he fastens the label required by chapter 338 by means of gum which is on the label part of stub-book leaf; this label, filled out as required by law, and in the presence of the officer, delivers this sealed and labeled sample to the vender or his representative.

"The four-ounce wide-mouthed bottle is now filled with the milk from the cylinder, a label pasted upon it on which the number of the inspection and sample number is written, this latter sample being the one taken for delivery to the department chemist. Should more than one sample be taken, each bottle delivered to the vender is marked with the sample number on its label by means of a marking diamond. This prevents the soaking off of a label from one sample bottle and trans-

[1] Act of 2 March, 1895, Sec. 13.

[2] City of New York, Report of Department of Health (1896), p. 99.

ferring it to one of the others, which might not be adulterated, so that on the trial, if one took place, there would be a discrepancy between the results of the analysis of the sample of milk made by the department chemist and those obtained by some chemist employed by the vender.

"If the milk is found to be apparently pure, only the record of the result of the inspection is made, and the inspector proceeds to the next place where he intends to inspect the milk.

"The condensed milk is obtained for the same reason, and also to determine whether it was made from skimmed or partly skimmed milk.

"After obtaining a sample, the inspector returns to headquarters and delivers it to the chemist for analysis, the method of delivery being as follows:

"Upon arrival at the office, he fills out a card, prepared for subsequent card indexing, as in the diagram.

Form G 23-1897. C. R. No. 3188.

Page No. 336. Health Department City of New York. Permit No. 8096.

3d Division (Food Inspection, Offensive Trades and Mercantile Establishments).

Inspection No. R565. Sample No. 55. Date, Jan. 31, 1897. Time, 10 A. M.

Name, Doe, John, s Business, Grocer. Years in Business, 10 years.

Address, 1200 East 16th st. Who in charge, Doe, John.

From whom purchased, D. Water, 186 Rock st. Qts. sold daily, 40.

Can No.	Contents.	Lact.	Temp.	Le't at 60°	Appearance, etc.	Can No.	Contents.	Lact.	Temp.	Le't at 60°	Appearance, etc.
1 2	35	100°	32°	91°	Thin taste, flat.	3 4					

Can Marks.			
1	2	3	4
P. H.			
4			

Lact. No. 583.

Ther. No. 601.

Citizen's Complaint No. 1230.

Held on Bail 1st Dist. Court, $100. 2/4/97.

Result of Trial, 2/10/97. Fined $150 at Court of Special Sessions.

Witness, Officer Roe.

Dipper in Can? Yes.

Was Can Wired? No.

Location of Can? In ice-box at rear of store.

Date Received..... To Inspector.....

Time..... *Offense.*

Inspector..... 1st.....

2d.....

3d.....

4th.....

Analysis, Can No. *Results.*

Water.....

Fat.....

Total Solids.....

Solids not fat.....

Approved:

.....

Sanitary Superintendent.

.....

Assistant Chemist.

.....

Chief Inspector.

—except he does not at that time fill in the vender's name. (The *s* at name of vender or representative indicates that proof of ownership was obtained.) He then delivers the sample, labeled with sample number and inspection number (only) to the chemist, who signs and dates the card. This is returned to the clerk for entry in the record book and indexed, a sample page of which is given below:

No..... Date obtained.....
Inspector..... Date delivered.....
Analyst..... Date reported.....
Obtained from.....
.....
Reason for obtaining sample.....
.....

ANALYSIS.

Lactometer at 60° Fahr..... Water.....
Equiv. to Specific Gravity..... Fat.....
Reaction to Litmus Paper..... Sugar.....
Odor..... Casein and Albumin.....
Remarks..... Salts.....
....
..... Total Solids.....
..... Solids not Fat.....
..... Fat by Lactoscope.....

"The data obtained from the card being copied in it, together with the name of the vender, this being taken from the stub of the "bottle label book," which stub is delivered with this card.

"At the end of forty-eight hours after reception of sample the card is delivered to the chemist, who indorses upon it the results of the analysis and returns it to the chief inspector, who, after careful examination, stamps on it "Arrest," or "Do Not Arrest." The results of the analysis, etc., are entered in the milk book, also this decision of the chief inspector.

Date Received, Jan. 31st, 1897. To inspector, Feb. 4th, 1897, 10.00 A. M.

Offense.

Time, 12 M. 1st.....
2d.....
Inspector Brown. 3d.....
Analysis, Can No. 1. 4th.....

Results.

Water, 89.31 per cent. .....
Fat, 3.59 per cent..... Solids 10 per cent. low.
Total Solids, 10.69 per cent ..... Borax and Formalin. Negative.
Solids not fat, 7.10 per cent .....
Reaction. Normal. .....

Approved:
CHARLES F. ROBERTS, M. D.,
Sanitary Superintendent.

EDMUND CLARK,
Assistant Chemist.
Feb. 2d, 1897.

EDWARD W. MARTIN,
Feb. 2d, 1897. *Chief Inspector.*

"He stamps 'Arrest' if the total solids are five per cent. or more below the legal standard of twelve per cent.; or if the amount of fat contained is ten per cent. or more below the legal standard of three per cent., or, as in condensed milk, if the amount of fat contained is ten per cent. or more below the legal standard of fat (condensed milk must contain fat equivalent to twenty-five per cent. of the total milk solids found); or if the cream, milk or condensed milk contains any antiseptic or foreign substance.

"Should the adulteration be less, however, than in the cases cited, 'Do Not Arrest' is stamped upon the card. This card is now forwarded to the sanitary superintendent, who approves or disapproves the decision of the chief inspector and returns the same.

"The inspector is then notified to appear at the office, and the card delivered to him, with instructions for further procedure.

"Although this may appear complicated, yet usually only a few hours over the forty-eight required elapse between the delivery of the sample for analysis and the obtaining of the warrant, should sufficient adulteration be detected for this course to be pursued.

"At the end of each day the inspector writes on a suitable blank, headed as below:

No.	Date.	Name.	Location.	Permit No.	Time.	Temp.	Lac.

the result of his day's work. This is forwarded by mail, reaches the office in the morning and is from time to time verified by a reinspection of the places recorded, by another inspector who has been selected to act as "Roundsman" to check and verify the work.

"At the end of the week, a report — summary of the week — is made out and delivered in person at Headquarters at 9 A. M. Mondays, as in sample given:

HEALTH DEPARTMENT OF THE CITY OF NEW YORK,
SANITARY BUREAU,
NEW YORK.....189

To the Chief Inspector of the Division of Food Inspection and Offensive Trades:

"SIR — I have the honor to submit the following report of the work performed by me in the Inspection of Milk for the week ending Saturday.....189

Sunday.....

Monday.....

Tuesday.....

Wednesday.....

Thursday.....

Friday.....

Saturday.....

	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total.
Number Inspections								
" Specimens Examined								
"								
" Citizens' Complaints Received								
" Citizens' Complaints held over since last Report								
" Original Complaints by Inspectors								
" Citizens' Complaints Returned for Orders								
" Citizens' Complaints Returned as Negative								
" Citizens' Complaints under Observation								
" Days at Court or Department								
" Special Day Inspections								
" Early Morning Inspections								
" Nights Special Work								
" Quarts Adulterated Milk Destroyed								
" Days in Country or at Laboratory								
" Arrests								
" Held on Bail								
" Trials at Special or General Sessions								
Amount of Fines								

Respectfully submitted,

.....

Milk Inspector.

The duty of the collector is to collect and deliver to the chemist samples of milk, secure all evidence that it may be necessary to use in case of trial, and to keep a careful record of all his proceedings. The chemist on his part must analyze with great care the samples given him, preserving with certainty their identity all the time, and he too must carefully record his work and be prepared to explain and justify it on the witness stand. In all but the largest cities all this frequently has to be done by one man. Occasionally, as in Philadelphia,[1] St. Louis,[2] and Atlanta,[3] specific rules are provided for the inspectors.

As most of the milk laws prescribe a standard in terms of total milk solids and milk fats, it is these elements which it is the business of the chemist to determine. The methods employed do not fall within the scope of this work. The technology of milk analysis may be studied in Leffman and Beam's *Analysis of Milk and Milk Products*, and Farrington and Wall's *Testing Milk and its Products*. It is sufficient to say that the Babcock and Adams methods are usually adopted for the estimation of the fats. There is very little legislation in regard to milk analyses other than such as specifies what chemists may be employed and that the analyses made by them shall be accepted as *prima facie*

[1] Philadelphia, Rules of Board of Health (1895), 144–150.

[2] St. Louis, Ordinances (1893), Chapter 14, Sec. 364.

[3] Atlanta, Ordinance of 22 May, 1893.

evidence: but in Maine[1] and Vermont[2] it is prescribed that all measuring instruments used in milk analyses shall be first tested (in Maine this is done by the director of the State College Experiment Station), that sulphuric acid used in the Babcock test shall have a sp. gr. of 1.82 and that no person shall test milk unless he or she has a certificate of competency from the Dairy School.

Not only are samples collected by city officials tested in municipal laboratories, but usually the offer is made to test samples brought in by citizens. A certain number avail themselves of this offer. Thus in Boston in 1896 there were 277 citizens' samples, in Cleveland in 1897 sixty-two samples.

Generally it is considered unwise to prosecute on citizens' samples, but if they are found to be below the standard the dealer is followed up by the city inspector; but in Chicago the ordinance provides that if such samples are below the standard "steps shall be taken for a prosecution."

In Chicago, and doubtless in many other cities, it is customary to have an analysis made by two chemists when a case is likely to go to court.

When milk is found to be below the standard the authorities may proceed at once to the prosecution of the offender, or if the offence is the first one, or if it is believed that the dealer in whose possession it was found is innocent of adulteration and the victim of another, a warning notice may be sent. The form used in Minneapolis is shown in Appendix 48.

It frequently happens that a dealer will so deliver milk that the last half of the can will be much below the standard. If that is probably the case a notice is sent. The Indianapolis form is shown below.[1]

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[1] Maine, Chapter 169 of 1895.

[2] Vermont, Chapter 81 of 1896.

[1] CITY OF INDIANAPOLIS.

BUREAU OF MILK INSPECTION.

"*You are hereby informed that a sample of milk recently obtained from you proved not to conform to the requirements of the Ordinances. Your attention is called to the fact that the sale of such milk or its possession with intent to sell renders you liable to the penalties provided by law. The sample was from a part of a can, and its poor quality was owing to a deficiency in cream, which, by careless handling, may have been proved of with the first portion.*"

[illegible]

[illegible]

In Chicago, Philadelphia, and other cities, dealers are encouraged to bring to the city inspector samples of milk to be tested when they suspect that the producer may be furnishing milk below the standard. In Brookline, Mass., one day in the week is set apart for this. In Philadelphia the dealers are also encouraged to use the lactometer, and a circular is sent to them from the board of health advising them to purchase a lactometer and thermometer and test all milk purchased. The dealers are also invited to visit the milk inspector's office and receive instruction in the use of the instrument.

UNCLEAN MILK.

Within the last few years there has grown up a very strong desire on the part of sanitary officials and progressive medical men for clean milk. At present this desire only affects a small part of the consumers, the great body of whom are content to use the dirty milk which is generally furnished by dairymen. It is possible at a few places, for persons who are willing to pay a considerable advance for it, to obtain clean milk, but the demand is not great, and the supply is scarcely equal to the demand. The great majority of milk consumers in cities at least, do not care whether their milk is clean or dirty, nor do they care very much about the amount of fat it contains, provided it is cheap, that is provided the price per quart is low. At present the price of clean milk appears to be necessarily higher than that of dirty milk, but it does not follow that it will always be so. The history of improvements in other forms of business leads us to suppose that it will be possible for producers to markedly improve their product without increasing the cost, provided they are forced to it by competition or otherwise.

If the mass of consumers continue to consider merely the number of cents per quart which they are obliged to pay, without regard to quality, and there is every reason to believe that they will so continue, there is little chance of improvement through competition. It therefore seems to be likely that the milk supply so far as cleanliness is concerned can only be improved by official control. Such control is being very generally urged by sanitary officials, and also by dairy commissioners, department of agriculture and experiment station officials, and other educated and experienced men who have at heart the interests of both producer and consumer.

By clean milk is meant milk free, not only from dirt, as it is properly understood, but free from disease producing organisms, and as free as possible from organisms which injure the quality and "keeping" power of the milk. There are several reasons why it is desirable that milk should be clean. The least important of these is that milk con-

taining cow dung and similar substances, offends the aesthetic sense; but this however, has little weight with the majority. Secondly, the presence of manure, hair, dirt, etc., and certain kinds of bacteria, as well as the use of improper food, and the improper use of certain foods, gives a peculiar "cowey" or "turnipy" taste to milk which is positively disagreeable to a great many consumers and leads them to seek another dealer or give up the use of raw milk. Third, the more bacteria there are in milk the sooner it sours or undergoes putrefactive changes and the greater the loss to the producer and consumer. This fact is one of the most powerful levers to be employed in the effort to improve the supply, for it is an argument which affects the pocket. Fourth, the danger of producing contagious disease by dirty milk. The danger of spreading scarlet fever, diphtheria, and typhoid fever will be alluded to when considering those diseases. The danger of transmitting tuberculosis through the medium of milk has received a vast amount of consideration of late, and though this danger is a real one, the relative importance of this cause of human tuberculosis has not been definitely determined. Lastly, there is a very great danger of gastro-intestinal disturbances in infants and young children from the ingestion of milk containing large numbers of bacteria. The harm may come from changes produced by the bacteria in the milk before ingestion, or it may come from the activity of the organisms in the gastro-intestinal tract. The exact aetiology of gastro-intestinal troubles is as yet little known, and accurate statistics in regard to infant mortality due to infected milk are as yet lacking, yet there is little doubt in the minds of the best observers that the most of the gastro-intestinal diseases of infants are due to defects in the milk supply.

In order to obtain clean milk for the public, it is necessary to control the methods of producing milk and handling it on the way from the producer to the customer.

Control of Herds and Dairies.

There has within recent years been some legislation providing for the inspection or licensing of milch cows. Thus in Wisconsin[1] the dairy commissioner may appoint an agent for the inspection of dairies. In California[2] the state dairy commissioner is required to inspect dairies. Maryland requires dairymen to register their herds and provides for their inspection.

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[1] Wisconsin Statutes [illegible]

[2] California Chapter [illegible]

[3] Maryland Chapter [illegible]

[illegible]

The first public act authorizing cities to protect their milk supply by control of the dairies was passed in Minnesota[1] in 1895. This law has been sustained by the courts[2] as has also the Maryland law. A recent act in New Jersey[3] while not specifically providing for the licensing and inspection of dairies apparently authorizes it. Special acts authorizing such inspection have been passed for the District of Columbia[4] and Pennsylvania cities of the second class.[5]

Notwithstanding the dearth of specific legislative authority, a considerable number of cities have taken more or less energetic action looking to the supervision of the sources of their milk supply. In many instances the action taken is merely one of inspection, advice and publicity, no control being exercised. In others control is exercised over the dairies within the jurisdiction of the municipality, and in others still the attempt is made to control all the sources of the milk supply of the city. In most instances what is accomplished is done under the grant of general sanitary power.

A number of cities have merely made inspections of the dairies and usually only those within the city limits. Sometimes such inspections have been made but once, to call to the public notice the condition of

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Live Stock Sanitary Board; in violation of which the parties offending shall be fined not less than one dollar nor more than twenty for each offense.

"It shall be the duty of the Live Stock Sanitary Board to have inspected at least annually, without notice to the owner or those in charge of any dairy or the parties supplying milk as named in section 19 of this article, the premises wherein cows are kept, and if such premises are found in an unsanitary condition the said board may prohibit the sale and shipment of milk from such premises until such time as such premises shall conform to the following sanitary rules."

(These rules as well as the complete law may be found in the seventh report of the state veterinarian.)

[1] Minnesota, Chapter 203 of 1895:

"SEC. 1. The city council of any city may by ordinance provide for the inspection of milk and of dairies and of dairy herds kept for the production of milk within its limits, and issue licenses, for which no fee shall be charged, for the sale of milk within its limits and regulate the same, and may authorize and empower the board of health to enforce all laws and ordinances relating to the production and sale of milk and the inspection of dairies and dairy herds producing milk for sale or consumption within such city, and to appoint such inspectors, experts, and chemists as are necessary for the proper enforcement of such laws and ordinances, their compensation to be fixed by the city council; and such inspectors, experts, and chemists shall be possessed of such necessary power within the limits of such city as shall be prescribed by ordinance, but no such ordinance shall conflict with any law of this State."

[2] State of Minnesota *vs.* Hans C. Nelson, October term of Supreme Court, 1896.

[3] New Jersey, Act of 23 April, 1897.

[4] Act of Congress, 2 March, 1895.

[5] Pennsylvania, Act of 26 June, 1895, Sec. 14.

the dairies in the hope of inducing some municipal action to bring about their improvement. Again such inspections are made annually or oftener. Often when decided nuisances are found they are abated under the nuisance laws. The results of all such investigations are usually published in reports which do some good in calling the attention of the public to the carelessness with which the milk supply is produced and handled.

The first step in the control of the sources of the milk supply is to know where these sources are. This can only be done through the licensing of milk dealers in the city and making it a requirement that the dealer shall keep the milk inspector informed as to where the milk which he sells is produced. The obtaining of such information is provided for in the New Jersey, District of Columbia and Minneapolis acts referred to on page 400, and this method, though without special legislative sanction, is adopted in Boston, Buffalo, Lynn, Meadville, Pa., Milwaukee, Nashua, New York, Omaha, and many other cities.

The blank form used for giving the information required before a license is issued varies somewhat in different cities. Those used in Boston and Minneapolis are given in Appendices 43 to 45. Not very much information is here required beyond a bare statement of where the milk is obtained.

For the purpose of facilitating the tracing to the producer of all milk sold in New York,

"The information obtained from the application blanks of wholesalers is entered upon cards and arranged as follows (example of card given)":

N. Y., Sus. & W. R. R.	8 Hrs.	Stillwell, James, Milford, Pike Co., Penn.
B. O. B. 13. 100 Qts.	Durham. 20. Well.	Port Jervis, Orange Co., N. Y. A. M. and P. M. 7.00 P. M. John Doe, 836 W. 42d St., N. Y. C.

The cards are first sorted as to railroads, then as to stations, then alphabetically, so that the names and addresses, amount of milk produced, etc., for all localities can be ascertained at a glance.

For instance, a milk dealer named John Smith obtains his supply from the Erie Railroad from Goshen. Looking at Erie Railroad cards we find Goshen, and the farmers supplying John Smith are A., B., etc., and we find on the appropriate cards the number of cows, quarts of milk given, character of water-supply, time of shipment, delivery, etc."

In New York also a map is prepared on which is marked the location of all dairy farms under the observation of the department.

A second step is to provide for an inspection of the herds and dairies from which the milk is derived. Without such inspection it is of course impossible to secure any efficient control over most of the conditions which determine the cleanliness and wholesomeness of the milk.

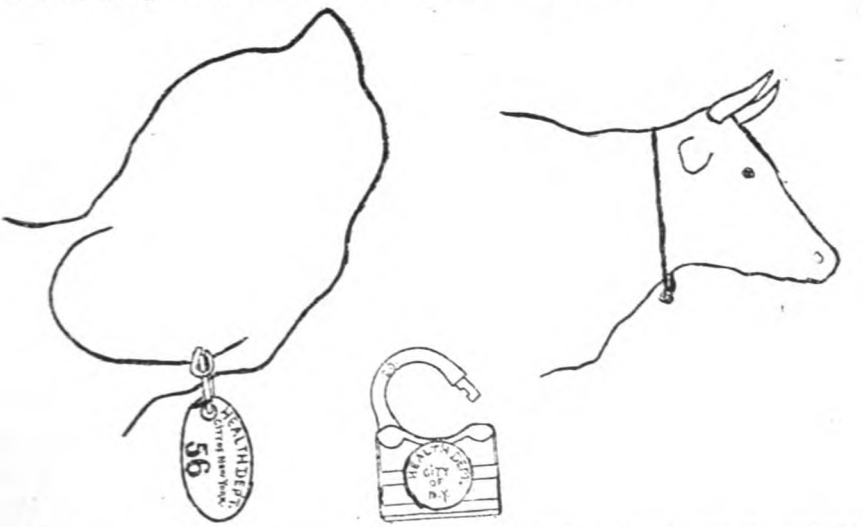
An inspection for purposes of control may be confined to the producers within the city limits, as in the City of New York, Baltimore, Boston, Brookline, Mass., Cincinnati, Cleveland, District of Columbia, Grand Rapids, Newton, Pittsburg, Newark, and Waltham, or it may extend to all the producers supplying the city wherever they may be located even if in an adjoining state, as in Asbury Park, N. J., Atlanta, Buffalo, Denver, Detroit, Los Angeles, Lynn, Meadville, Penn., Milwaukee, Minneapolis, Nashua, N. H., Oakland, Cal., Omaha, Pittsfield, Mass., Portland, Me., Rochester, St. Louis, St. Paul, Syracuse, Warren, O., and Westbrook, Me. While the latter method of inspection of the whole supply is the goal to be desired, the control of the city dairies is easier to start with and may perhaps be extended to the others. Certainly the work done by some cities, as Boston, New York, and the District of Columbia, in controlling their local supply, is most commendable and may serve as a model for more extended efforts on their part, as well as for other cities. This dairy inspection wherever it has been carried out has been under the direction of the local health department, though state officials have sometimes been called upon to assist. As the health of the animals is an important consideration on all dairy farms, it is advisable that a veterinarian should make the inspection, or at least be called upon to examine the cows. This is done in Baltimore, Brookline, Denver, District of Columbia, Lynn, Minneapolis, New York, St. Louis, St. Paul, and other cities. In Asbury Park an agent of the state dairy commissioner inspects the herds. In Denver the inspection is made in conjunction with state cattle commissioners and the tuberculin used is furnished by the United States department of agriculture. In Portland, Me., and Westbrook, Me., the animals are examined by the state board of cattle commissioners.

The result of the dairy farm inspection is usually reported to the board of health on blanks furnished for that purpose. The blank used in the District of Columbia may be found in Appendix 50. Besides the filing of this report in New York, a card index is prepared giving upon one side of the card the more general results of the sanitary inspection, and upon the other the outline plan of the stable.

8496 1246	7/30/95 7/30/95	Map No. 1000. Roe, Richard, 1200 W. 61st st.	
No. of Cows Water Milk	10 12760 a987	Stable, brick, 23×40×20. Ventilation, good. No. of cu. ft. air per Cow, 1840. Drainage, City Sewer. Manure, Removed Daily. Care of Cows, Good. Condition of Cows, Good. Food, bran, meal, hay.	Water for Cows, Croton. Water for washing, Croton. Disposal of Milk, Sold.

Something besides inspection is in a few cities undertaken in order to better control the condition of the animals kept by the milk producers. In New York City at the time of inspection, a steel tag is fastened in the right ear of the cow at a point where it is least liable to be rubbed off. Each tag has a different number. The day after the inspection and tagging, the cow is tested with tuberculin.[1] If any animal is found to be tuberculous,

"The healthy cows are then separated from those found to be tuberculous, and a chain made of steel, with welded links, is fastened around the neck of the condemned animal by means of a padlock numbered and marked "Health Department." This lock is sent to the inspector unlocked. He locks the chain with it, and this chain cannot be removed until the time of killing, as the key is kept at headquarters and is not at any time in the possession of any one except the chief inspector.



"These latter are taken to a convenient place and slaughtered, with the consent of the owner, and an autopsy made in each case. The carcass is taken to the Offal Dock or destroyed in offal tank; the killing bed is then washed and disinfected, and the healthy cows are allowed to return to the stable."

A record of all this work is kept as follows:

"A card is prepared giving tag number of each cow, date tagged and date and result of tuberculin test (see diagram below):

8496 Wagon P. 1246	7/30/95 7/30/95	Roe, Richard, 1200 W. 61st st.	No. of Cows, 10 Map No. 1000.
730	9/4/96	9/5/96	O. K.
731	9/4/96	9/5/96	O. K.
732	9/4/96	9/5/96	O. K.
733	9/4/96	9/5/96	Positive.
734	9/4/96	9/5/96	O. K.
735	9/4/96	9/5/96	O. K.
736	9/4/96	9/5/96	Positive.

—and is indexed under location.

[1] The details of this test are given on pp. 117–119 of the Report of the Department of Health of the City of New York (1896).

"The tag number of all cows examined and killed is entered upon cards as follows:

"No. 1. A plain card, as in diagram below, where the cow is examined and passed as being healthy.

Tag No.	Date Examined.	Smith, John, 15 Kossuth St.
26	12/12/96	Red cow, white star, dehorned.
		.....
		O *Inspector.*

"No. 2. A card with the upper projection at the left, as in diagram, when the cow has been condemned and slaughtered; the result of the autopsy being entered upon the reverse, as in diagram below:

Tag No. 25.

5/12/96.

John Doe, 1000 14th ave.

Red Cow.

O .....

Inspector.

Tag No. 25.

Result of Autopsy.

Liver,
Lungs,
Kidneys,
Mammary Glands,
.....
.....

O .....

Inspector.

"No. 3. A card with the projection in the middle, where the cow is examined, classed as suspicious and held for examination, as in diagram below:

Reinspect Tag, No. 5.

Tagged 11/12/96.

Richard Roe, 10 Boulder st.

Black Cow, white star, white spot on right shoulder.

O .....

Inspector.

"No. 4. And a card with the projection at the right end, when the cow has been examined, passed as healthy and subsequently killed where we could examine its condition. The entries being the same as in No. 2.

"These tag-numbered cards are then kept on file in consecutive numbers, changing them as the results require.

A temperature card is kept, and all the temperatures in each test are recorded, as shown below:

No. herd.	Temperature before. 7 a. m.	8 a. m.	10 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Tuberculin injection etc.	Amount, etc., Carb.
Aug. 11	99	100.2	100.0	100.5	105.2	105.2	104.6	104.6	105.2	Neck R 30 c. c. E.	

Date of test.	Temperature (Arlyn). 4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	Average.	Maximum.	Interval between injection and rise of temperature above maximum normal.	Duration of rise.	Amount of rise.	Remarks.	Name, etc.
									Hrs.	Hrs.			
Aug. 11	101	104.8	101.8	105.3			104.5	105.3	19	.....	1°	Negative	Pat. H. Dunn, 530-42 E. 68th st.

In this way a full and compete record is kept, and one that is easily referred to.

It is the opinion of the department officials in New York that the freeing from tuberculosis of the cows kept in the city, will, through competition, result in a similar but voluntary purging of the country herds.

Among other cities which require the tuberculin test are Brookline, Mass., Denver, Lynn, Minneapolis, Portland, Me., St. Paul, and Westbrook, Me. In San Francisco it was attempted, but owing to violent opposition, had to be given up. Legislation could not be obtained empowering the board of health to apply the test to all cows supplying the city, and the dairymen in the city represented that it would be a hardship to eradicate the disease from their herds, and let outside dairymen go free.[1] Examples are given below of a local ordinance under which the tuberculin test is required.[2]

[1] San Francisco, Report of Health Department (1897-8), p. 182.

[2] Westbrook, Me., Rules and Regulations, Board of Health, 10 June, 1897:

"Sec. 1. No person shall at any time by himself, his clerk, his servant or agent, directly or indirectly sell or offer for sale any milk or cream within the City of Westbrook, unless such milk or cream, and the cow from which such milk or cream was taken, shall have first been examined by the board of cattle commissioners or by some veterinary surgeon approved by them or appointed by the board of health and physician of Westbrook, and shall have been found by such examiner with the assistance of the board of health to be free from disease, and such cow in healthy and free from disease and such cow shall be examined at least once in each year."

[illegible] Regulations, Boston, [illegible] March, 1897:

"No milk from any cow [illegible] shall be sold or offered for sale in the city proper of Boston [illegible] by any person other than the producer and dealer in

In New Orleans and St. Paul free inspection of dairy farms was offered, but not required by the health department. It was intended that a certificate should be given all herds free from diseases, and that this certificate would be valuable enough to induce the dairymen to apply for inspection. The board of health in New Orleans[1] reports this a failure, and the health commissioner of St. Paul[2] says it was only a partial success. In the latter city it has now been succeeded by compulsory examination. In Indianapolis, on the other hand, the voluntary method seems to have been successful.[3] The following is from a letter by Dr. Hurty of the Indiana state board of health to Dr. Knopf in regard to what has been done in that city:

"The city board of health induced one of the prominent dairymen to write a letter, requesting that his herd be tested with tuberculin, and also that a sanitary survey be made of his dairy and suggestions be made for sanitary improvements, he promising to destroy all cattle which reacted to the tubeculin test, and to make all sanitary improvements suggested. For this he was to receive a certificate from the board of health simply stating the facts of the case. This, you see, was a true commercial method. The work was done, as above indicated, and immediately the popular demand arose for the milk supplied from tuberculin-tested animals. Every dairy supplying milk in this city has now been tested and sanitary surveys made as above. About six per cent. of the dairy cattle have been killed, and in every instance it was discovered that the tuberculin test was accurate and absolute, This method seems better than the legal method."

Besides the City of New York, Minneapolis, Milwaukee, and Lynn, Mass., tag the animals which successfully pass the tuberculin test.

To insure the city against the importation of infected animals the rule given below has recently been adopted in the City of New York.[4]

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the board of health that the milk has been drawn from healthy cows. The condition of health is to be based upon results of tuberculin test by a veterinarian that is satisfactory to the state cattle commission and to the inspector of milk for the City of Lynn. After test each animal to have ear tag and certificate of health. Also that the animals used are properly fed and the premises occupied by them are in a good condition of sanitation."

[1] Louisiana, State Board of Health Report (1892–3), p. 113.

[2] St. Paul, Report of Health Commissioner (1896), p. 4.

[3] Proplylaxis and Treatment of Pulmonary Tuberculosis, Knopf, p. 77.

[4] City of New York, Sanitary Code (1899), as amended 15 February, 1899:

"SEC. 135. That no diseased or sickly cattle, swine or sheep, nor any horse, dog or cat, which is suffering from, or has been exposed to any disease which is contagious among such animals shall be brought into the City of New York. All persons, corporations, or companies bringing milch cows into the City of New York shall furnish a certificate signed by a veterinarian who is a graduate of a recognized Veterinary College, with the date of graduation and the name of college from which the degree was received, to the effect that said cows are free from tuberculosis as far as may be determined by physical examination and the tuberculin test. Said certificate shall give a number which has been permanently attached to each cow, and a description sufficiently accurate for identification, stating the date (which

In most states the cattle laws would provide for the disposal of the animals condemned in dairy inspections and such would be killed; but local regulations appear to be necessary in most cities to prevent the sale of milk from animals that have been condemned, before they are finally disposed of. The St. Louis regulation is given below.[1]

While an annual inspection is excellent and is maintained by most of the cities referred to in the last few pages, yet a more frequent inspection is desirable and is sometimes carried out. Thus in Warren, O., the dairies are inspected two or three times each year; in Syracuse, twice a year; in Omaha they are inspected every two months; in Brookline, Mass., twice each year, and also several times in the District of Columbia. In Minneapolis, Newton, Mass., and Richmond, Ind., the dairies are inspected monthly.

In order to obtain prompt information in regard to disease among cows, it is provided in the rules of the District of Columbia as follows:

"It shall be the duty of any person having charge or control of any premises upon which cows are kept to notify the health officer, in writing, of the existence of any contagious or infectious disease among such cows, within twenty-four hours of the discovery thereof, and to thoroughly isolate any cow or cows affected or which may reasonably be believed to be infected, and to exercise such other precautions as may be directed, in writing, by the health officer."

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must be not more than sixty days prior to the time they are brought into the city), the place of examination, the temperature of the cow or cows at intervals of three hours for twelve hours before the subcutaneous injection of the tuberculin, the preparation of tuberculin used, the location of the injection, the quantity injected, the temperature at the tenth hour after the injection of the tuberculin and every three hours after the aforesaid tenth hour for twelve hours, or until the reaction is completed. No cow with a certificate which states that said cow gave a reaction of two degrees F. after the injection with 0. 5 c. c of the tuberculin prepared by the department of health of the City of New York (or its equivalent), diluted with ten times its volume of a 0.5 per cent. watery solution of carbolic acid, shall be brought into the City of New York."

[1] St. Louis, Ordinance of 6 April, 1896:

"SEC. 16. When said veterinary surgeon or surgeons shall find any cow or cows in a dairy, from which dairy milk is brought into this city for sale, to be diseased, they shall immediately make a report of the facts in duplicate; one of said reports to be delivered to the health commissioner, and the other to the person, firm or corporation receiving and disposing of the milk from such cows. On receipt of a report that milk from the diseased cows is being brought into this city the health commissioner shall issue an order forbidding its sale in the City of St. Louis until such time as the health commissioner is satisfied by approved veterinary certificate that such diseased cows have been separated from the balance of the herd; and if the parties who shall have been served with such order fail to obey the same the health commissioner is hereby empowered to give notice to the citizens of St. Louis through the newspapers doing the city printing, stating all the facts in the case, and to warn them against the use of such milk. And said parties may be proceeded against in the manner prescribed by the provisions of this ordinance."

The results of dairy inspection show that if it is desired to have clean milk from healthy cows, the average dairy is not at the present time in any condition to supply it. Thus in New York in 1896[1] out of 1,123 cows tested with tuberculin 192 were condemned. In Denver[2] four per cent. of the cows tested with tuberculin were condemed, in Lynn[3] of 3,471 cows tested 562 were condemned, in Minneapolis[4] of 4,036 cows tested 172 were condemned, In Omaha[5] of 3,977 cows, 140 were condemned. Of 1,356 cows in the District of Columbia[6] 52 were condemned, in Syracuse[7] of 3,843 cows 300 were tuberculous. In Philadelphia[8] 101 out of 382, and in St. Paul[9] 154 out of 2,084 cows were infected. In this connection it is well to remember that not only is there danger of the spread of tuberculosis through the milk of tuberculous cows but this milk is usually deficient in fat.

Of ninety-seven dairies inspected in Baltimore in 1894[10] eighteen were reported in bad condition. In Concord, Mass.,[11] on a second inspection twenty-one per cent. of the farms were in fair condition, and twenty-three per cent. in bad condition. In Somerville, Mass.,[12] of thirty-seven applications to keep cows, seven were refused on account of the condition of the stables, etc. In Rochester[13] many of the stables were in bad condition, the pails, strainers, and cans were not clean, there was insufficient water and no way of heating it for washing, and the stables and milk rooms were dirty. In fact the conditions were such that when the health officer desired to obtain milk which should be clean and suitable for pasteurization he could not find a single dealer able to supply it, and Dr. Getty in Yonkers had much the same experience. The veterinarian of the District of Columbia states that on his first inspection he found the flanks of hundreds of cows caked with manure, thus ensuring dirty milk. The same undesirable conditions were found in Milwaukee[14] where a microscopical examination of the milk showed

[1] New York, Report of Department of Health (1896), p. 124.

[2] Denver, Report of Bureau of Health (1896), p. 81.

[3] Massachusetts, State Board of Health Report (1896), p. 881.

[4] Minneapolis, Report of Health Department (1899), p. 37.

[5] Omaha, Report of Health Department (1897), p. 12.

[6] District of Columbia, Report of Health Officer (1897), p. 78.

[7] Syracuse, Report of Board of Health (1899), p. 7.

[8] Philadelphia, Report of Bureau of Health (1899), p. 125.

[9] St. Paul, Report of Commissioner of Health (1899), p. 7.

[10] Baltimore, Report of Health Department (1894), p. 18.

[11] Massachusetts, State Board of Health Report (1897), p. 668.

[12] Somerville, Report of Board of Health (1897).

[13] Rochester, Report of Health Department (1897).

[14] Milwaukee, Report of Commissioner of Health for year ending April, 1897, p. 10.

"manure, bits of cow food, numerous hairs, mould and fungous growths, bits of insects, threads, human hair, moss, and other disgusting substances." The secretary of the state board of health in Providence could not get a quart of milk which did not show an appreciable sediment of dirt, and an examination of the dairies in that city[1] showed that twenty-five per cent. were in bad condition. Out of eighty-three applications for dairy farm licenses in the District of Columbia in 1897 thirty-nine were refused. In New Orleans[2] an inspection showed that many of the cow stables were in a filthy condition and the water used for washing was grossly contaminated. Photographs of the premises are shown in the report referred to. In St. Louis:[3]

"An examination of the dairies disclosed that a fearful condition existed. Cows covered with filth were confined continually in small, badly ventilated stables, the manure forced into sewers or thrown into small water courses, creating a stench that was intolerable; the milk cooled in wells and cisterns, the water of which from the surroundings must necessarily be impure; milk placed in filthy cans by unwashed hands, and the atmosphere of the stables where the milk cans were allowed to remain charged with odorous gases and teeming with pestiferous germs; the cows showing unmistakable signs of being unhealthy, everything and everywhere showing a complete absence of the first principles of cleanliness, and a total ignorance of any of the requirements of sanitation; in fact, the condition of the cows, the places where the milk was kept, and the general surroundings being simply indescribable."

Besides inspecting dairy farms and stables and testing and tagging cows, another and very effectual method of controlling milk production may be adopted, and that is the licensing of the producer. This is certainly the best way of controlling the milk supply produced within the city limits, for the license may be withheld or revoked if the conditions are not satisfactory. For producers outside the municipality a similar control may be exercised if license to import or sell is refused unless the conditions of production are satisfactory. Such discriminating licensing presupposes a complete knowledge of the sources of supply and a thorough inspection of all producers' premises and animals. How this may be accomplished has been shown on the preceding pages. Among the cities which license cow stables only within their corporate limits may be mentioned Baltimore, Boston, Brookline, Mass., Chicago, Cincinnati, District of Columbia, Newark, New Bedford, Newton, New York, Paterson, Pittsburgh, Somerville, and Waltham, Mass. In Philadelphia it is forbidden to keep cows in the city except in the rural portions, and the health officers of Newark, Milwaukee, and other cities express a desire to do the same. Usually no fee is charged for such a

[1] Providence, Report of Superintendent of Health (1896), p. 44.

[2] Louisiana, Report of Board of Health (1892–93), p. 114.

[3] St. Louis, Report of Health Commissioner (1895–6), p. 27.

license but sometimes it is, as in Buffalo, where it is one dollar, and in Newark, where it is ten cents.

The following cities make a more or less determined effort to control on the lines laid down, their entire milk supply: Buffalo, Detroit, Denver, Indianapolis, Meadville, Pa., Milwaukee, Minneapolis, Montclair, N. J., Nashua, N. H., Omaha, Portland, Me., North Adams, Mass., St. Louis, St. Paul, and several smaller Minnesota cities, Pittsfield, Mass., Westbrook, Me., and Warren, O. The District of Columbia attempted to control its rural supply by requiring a certificate of inspection of all of the country herds from which milk was sent to the city; but this resulted in failure, as the farmers could enploy any veterinarian and most of them did not prove reliable. But good results are obtained when, as in Lynn, Portland and Westbrook, the certificate must be from the cattle commissioners or some veterinarian satisfactory to them or the board of health or the city officers, or in Asbury Park, N. J., where the inspection is made under the direction of the state dairy commissioner.

In St. Louis two veterinary physicians are appointed by the health commissioner with the approval of the board of health, who receive $175 per month each, and are obliged to keep a horse and buggy at their own expense, and are empowered to visit dairy farms within 150 miles of the city.

The larger cities have not accomplished as much as the smaller; of the former, Denver, Minneapolis and St. Louis have done the most, Minneapolis having been the most successful. The best examples of milk control, so far as the producer is concerned, are to be sought among the smaller cities and towns.

Regulations for the Care of Milk.

A number of cities have made rules for the proper care of milk so that it shall be delivered to consumers in the best possible condition. Many of these rules are not intended to be enforced by penalties but are rather intended as directions for the education of the producer and dealer. A number of states, as Illinois, Minnesota, West Virginia, and Wisconsin, have general provisions in their milk laws requiring that cows shall be properly cared for, housed and fed, but in the absence of specific regulations it is not likely that they can accomplish much. Such general provisions are also found in a number of cities, as Atlanta, Boston, Buffalo, Chicago, Cincinnati, Denver, Memphis, Minneapolis, Omaha, and Paterson. The following from Minnesota[1] may be given as one of the most explicit of these:

[1] Minnesota, Chapter 295 of 1899, Sec. 5.

"No person shall keep cows for the production of milk for sale or consumption within the City of Minneapolis in an over-crowded condition, or in stables which are not properly ventilated, or which are filthy from an accumulation of animal refuse, or from any other cause; nor shall milk for such purposes be drawn from cows which are themselves in a condition of filth or uncleanliness, or from cows which are affected with tuberculosis or any other form of disease, or from cows which are fed, either wholly or in part, upon distillery waste or brewery grains, or the waste of vinegar factories, in a fermented condition, or upon any other form of food which will produce milk which is unhealthy or unwholesome, or from cows which are supplied with water which is impure or unwholesome; and all milk thus produced is hereby declared to be unclean, impure, unhealthy, and unwholesome milk."

To accomplish anything in the way of education, rules must be more explicit and cover a wider range. The following rules are given as a basis for preparing such a set of regulations for municipal use. These rules were prepared by the bureau of animal industry of the department of agriculture, and are especially worthy of consideration because they come from such a source. The department of agriculture has primarily at heart the interests of the producer and strives to recommend such measures as will serve the pecuniary interests of the dairymen. The department evidently believes that it pays the producer to furnish high grade products and attempts to show how it may be done. These rules which are here given are intended to be printed on a large card and hung in the stable:

FIFTY DIARY RULES.

UNITED STATES DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY — DAIRY DIVISION.

(FROM FARMERS' BULLETIN NO. 63.)

THE OWNER AND HIS HELPERS.

1. Read current dairy literature and keep posted on new ideas.

2. Observe and enforce the utmost cleanliness about the cattle, their attendants, the stable, the dairy, and all utensils.

3. A person suffering from any disease, or who has been exposed to a contagious disease, must remain away from the cows and the milk.

THE STABLE.

4. Keep dairy cattle in a room or building by themselves. It is preferable to have no cellar below and no storage loft above.

5. Stables should be well ventilated, lighted and drained, should have tight floors and walls and be plainly constructed.

6. Never use musty or dirty litter.

7. Allow no strong smelling material in the stable for any length of time. Store the manure under cover outside the cow stable and remove from premises as often as practicable.

8. Whitewash the stable once or twice a year; use land plaster in the manure gutters daily.

9. Use no dry, dusty feed just previous to milking; if fodder is dusty sprinkle it before it is fed.

10. Clean and thoroughly air the stable before milking; in hot weather sprinkle the floor.

11. Keep the stable and dairy room in good condition, and then insist that the dairy, factory, or place where the milk goes be kept equally well.

THE COWS.

12. Have the herd examined at least twice a year by a skilled veterinarian.

13. Promptly remove from the herd any animal suspected of being in bad health, and reject her milk. Never add an animal to the herd until certain it is free from disease, especially tuberculosis.

14. Do not move cows faster than a comfortable walk while on the way to place of milking or feeding.

15. Never allow the cows to be excited by hard driving, abuse, loud talking, or unnecessary disturbance; do not expose them to cold or storms.

16. Do not change the feed suddenly.

17. Feed liberally, and use only fresh, palatable feed stuffs; in no case should decomposed or moldy material be used.

18. Provide water in abundance, easy of access, and always pure; fresh, but not too cold.

19. Salt should always be accessible.

20. Do not allow any strong flavored food, like garlic, cabbage, and turnips, to be eaten, except immediately after milking.

21. Clean the entire body of the cow daily. If hair in the region of the udder is not easily kept clean it should be clipped.

22. Do not use the milk within twenty days before calving, nor for three to five days afterwards.

MILKING.

23. The milker should be clean in all respects; he should not use tobacco; he should wash and dry his hands just before milking.

24. The milker should wear a clean outer garment, used only when milking, and kept in a clean place at other times.

25. Brush the udder and surrounding parts just before milking, and wipe them with a clean, damp cloth or sponge.

26. Milk quietly, quickly, cleanly, and thoroughly. Cows do not like unnecessary noise or delay. Commence milking at exactly the same hour every morning and evening, and milk the cows in the same order.

27. Throw away (but not on the floor—better in the gutter) the first few streams from each teat; this milk is very watery and of little value, but it may injure the rest.

28. If in any milking a part of the milk is bloody or stringy or unnatural in appearance, the whole mess should be rejected.

29. Milk with dry hands; never allow the hands to come in contact with the milk.

30. Do not allow dogs, cats, or loafers to be around at milking time.

31. If any accident occurs by which a pail full or partly full of milk becomes dirty, do not try to remedy this by straining, but reject all this milk and rinse the pail.

32. Weigh and record the milk given by each cow, and take a sample morning and night, at least once a week, for testing by the fat test.

CARE OF MILK.

33. Remove the milk of every cow at once from the stable to a clean, dry room, where the air is pure and sweet. Do not allow cans to remain in stables while they are being filled.

34. Strain the milk through a metal gauze and a flannel cloth or layer of cotton, as soon as it is drawn.

35. Aerate and cool the milk as soon as strained. If an apparatus for airing and cooling at the same time is not at hand, the milk should be aired first. This must be done in pure air, and it should then be cooled to 45 degrees if the milk is for shipment, or to 60 degrees if for home use or delivery to a factory.

36. Never close a can containing warm milk which has not been aerated.

37. If cover is left off the can, a piece of cloth or mosquito netting should be used to keep out insects.

38. If milk is stored, it should be held in tanks of fresh, cold water (renewed daily), in a clean dry, cold room. Unless it is desired to remove cream, it should be stirred with a tin stirrer often enough to prevent forming a thick cream layer.

39. Keep the night milk under shelter so rain can not get into the cans. In warm weather hold it in a tank of fresh cold water.

40. Never mix fresh warm milk with that which has been cooled.

41. Do not allow the milk to freeze.

42. Under no circumstances should anything be added to milk to prevent its souring. Cleanliness and cold are the only preventives needed.

43. All milk should be in good condition when delivered. This may make it necessary to deliver twice a day during the hottest weather.

44. When cans are hauled far they should be full, and carried in a spring wagon.

45. In hot weather cover the cans, when moved in a wagon, with a clean wet blanket or canvas.

THE UTENSILS.

46. Milk utensils for farm use should be made of metal and have all joints smoothly soldered. Never allow them to become rusty or rough inside.

47. Do not haul waste products back to the farm in the same can used for delivering milk. When this is unavoidable, insist that the skim milk or whey tank be kept clean.

48. Cans used for the return of skim milk or whey should be emptied and cleaned as soon as they arrive at the farm.

49. Clean all dairy utensils by first thoroughly rinsing them in warm water; then clean inside and out with a brush and hot water in which a cleaning material is dissolved; then rinse and, lastly, sterilize by boiling water or steam. Use pure water only.

50. After cleaning, keep utensils, inverted, in pure air, and sun if possible, until wanted for use.

Rules in regard to the care of cows and milk have been promulgated by the Illinois state board of health (30 September, 1895), and have been adopted in Boston, District of Columbia, Fitchburg, Haverhill, Indianapolis, New York, Philadelphia, and St. Louis. A few rules touching two or three of these points are found in a number of other cities and sometimes in state legislation. None of the municipal regulations equal in fullness those above given though they may in some respects be more suitable for municipal needs.

The necessity of providing more explicitly for the construction of new stables is felt in cities. Thus in St. Louis:[1]

". . . All single stalls shall be at least three feet wide, double stalls six feet wide, and all stalls shall be at least seven feet long; the height of ceilings from the floor shall be at least eight feet; the floors must be of tight plank, or be paved with brick or stone, laid in cement; if paved with brick or stone, then the earth below it shall be sufficiently solid to prevent its becoming a receptacle of filth and offensive matter; the floors of the stalls shall slope down into a drain or gutter, which shall be at least twelve inches wide and four inches deep, and said drain or gutter shall connect with and lead into a sewer through two intervening catch basins or tightly cemented cesspools, so that waste matter can be carried or hauled away. Openings for ventilation must be placed on at least two sides of the building, with openings not less than two feet square for every double stall or two single stalls, and there must be roomy ventilators in the roof not less than one for every twenty feet or fraction thereof in the length of the building."

In St. Louis provision is also made for the reconstruction of old stables.[2] See also rules in regard to stables on page 161.

The rules of the Illinois state board of health (which were adopted on the suggestion of the Chicago commissioner of health), of the District of Columbia and other cities also require the connection of stables with the sewer.

The area provided for the cows is variously prescribed; in the Illinois rules, Brookline, the District of Columbia, and Indianapolis,

[1] St. Louis, Ordinance of 6 April, 1896.

[2] St. Louis, Ordinance of 6 April, 1896:

"SEC. 9. All dairies or cow stables, now erected or established, when found to be so badly lighted or ventilated as to be injurious or unhealthy for cows, or not provided with legal catch basins or tightly cemented cesspools, so that waste matter can be carried or hauled away, or shall be conducted in an uncleanly manner, shall be deemed a nuisance. It shall be the duty of the Board of Health when any report shall be made of the bad or improper construction of any dairy or cow stable, or of any nuisance created by any dairy, cow stable or cow lot, to notify the owner or proprietor thereof to show cause before the said Board of Health at the time and place specified in said notice, why said dairy or cow stable should not be altered or changed, or such defects remedied or nuisance removed, which notice for the party complained against to appear shall be served at least five days before the date specified in such notice; said notice shall be served by leaving the same at the place of business or residence of the parties to be affected thereby by some officer or person duly qualified to certify to such notice; and all notices of this kind issued by the Board of Health shall be signed by the presiding officer of the Board of Health or the Health Commissioner. At the time fixed in said notice the parties may appear in person or by attorney, or cause may be shown by affidavit, and if in the opinion of the Board of Health and Health Commissioner no good and sufficient cause be shown why the said nuisance should not be abated, discontinued or removed, or said cow stables reconstructed, the Health Commissioner shall order the said parties to abate, discontinue, remove, or reconstruct the same within such time as the Health Commissioner may deem reasonable and necessary. If, upon the hearing of the affidavits and the evidence adduced in the case, the Board shall find the facts to be in favor of the parties before them, and so decide, the case shall be dismissed."

each animal must have 500 cubic feet of space; but in new stables in Brookline they must have 700 cubic feet; in Oregon[1] 800 cubic feet, in Boston and Brookline, 1,000 cubic feet. In Oregon, Illinois, and the District of Columbia the stalls must be four feet wide. In New York City and in the rural parts of Rochester, only fifteen cows are allowed per acre, and in Buffalo only one cow per acre. In the built up portion of Rochester and Macon, Ga., there may be one cow to each lot (33 feet by 100 feet). In Boston one cow to each 3,000 square feet. In Brookline stables must have ventilators in the roof and sliding glass windows at the sides. In Fitchburg the walls and ceilings must be thoroughly cleaned of all litter, cobwebs, etc., at least once a month. No swine may be kept in a cow stable in Newton, Mass., and no manure shall be kept in the cellar in the latter town. The Illinois and District of Columbia rules require that the manure shall be kept in a water tight receptacle outside of the stable. The condition of the cow yard is prescribed in Illinois and District of Columbia.[2]

In regard to cows the Fitchburg rules require grooming only three times a week. In Philadelphia the feeding of turnips, cabbage and anything which may give a taste to the milk is forbidden entirely, and there is a similar rule in Indianapolis. In Cincinnati cows must be put out to pasture twelve hours daily from May 1 to October 1.

There is a difference of opinion as to the advisability of washing the teats and udder, but it is prescribed in the New York, Philadelphia, and Fitchburg rules, and, in addition, the Fitchburg rules require that the udder and flank shall be carded and brushed before milking.

The experience of Detroit,[3] Grand Rapids[4] and Providence, and probably other cities, that milkmen will carry garbage back to their farms in milk wagons and even in milk cans has led to the addition to the milk rules of a prohibition of this practice.

The use of bottles for delivering milk has its advantages in that there is less handling and exposure of the milk, and hence it can be kept cleaner. Tests of bottled milk at Montclair, N. J., showed that samples contained 24,817 bacteria per c.c. while the average of can milk was [illegible] per c.c.

[illegible]

The objection to the use of bottles is that they are not readily sterilized with boiling water without serious breakage, and that as they may be carried into the houses and even rooms and put into the hands of persons sick with contagious disease, such disease may be spread in that manner. Instances of such are reported. It is said also that quart bottles a little under size are readily purchased.[1] To prevent danger from contagious disease in bottles the Buffalo, Chicago, and Yonkers rules forbid their delivery where there is contagious disease. In Los Angeles the use of bottles is forbidden at all times.[2] The following statute in regard to cleansing bottles and other vessels is found in Minnesota.[3] See also the New York rules below.:

"Any person or persons, firm or corporation who receives any milk or cream, in cans, bottles, or vessels, which has been transported over any railroad or boat line, where such cans, bottles, or vessels are to be returned, shall cause the said cans, bottles, or vessels to be emptied before the said milk or cream contained therein shall become sour, and shall cause the said cans, bottles, and vessels to be immediately washed and thoroughly cleansed and aired."

The rules proposed by the Massachusetts Association of Boards of Health[4] in addition, prescribe that all utensils in which milk is delivered to the consumer shall be not only cleaned but be sterilized before they are used again. This rule has been adopted in Boston. The New York City rules require that all utensils shall be washed with boiling water and soda, soap or alkali, and then rinsed with plain boiling water.

The rules of the department of agriculture relate to the producer, rather than the dealer, and experience has shown that additional care must be exercised by every dealer if it is desired that the milk shall reach the consumer in the best possible condition. The following are the rules adopted in New York City:

"Milk should be kept in some place where dust and other impurities cannot fall into it, such as a box with tight-fitting cover; preferably an icebox.

"The milk should be kept at as low a temperature as possible, not above fifty degrees Fahrenheit.

"After the day's sales are over, the measures and utensils used in the sale of milk should be thoroughly cleaned with boiling water, to which a small amount of soda has been added in the proportion of one tablespoonful of washing soda to a gallon of water.

"The overflow pipe from the icebox in which the milk is kept must not be connected directly with the drain pipe or sewer, but must discharge into an open, water-supplied, properly-trapped, sewer-connected sink (see Section 41 of the Sanitary Code).

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[1] Philadelphia, Report of Board of Health (1896), p. 140.

[2] Los Angeles, Resolution of Board of Health, 10 April, 1899.

[3] Minnesota, Chapter 202 of 1895.

[4] Journal of Massachusetts Association of Boards of Health, Vol. VII., p. 120.

"The icebox in which the milk is kept should be cleaned, by scrubbing out with hot soda solution made as in No. 3, at least twice a week.

"In selling milk, stir up the contents of the can thoroughly before measuring out the amount desired. This will prevent unintentional skimming. In this way the last quart of milk sold from the can will contain as much cream as the first quart sold.

"It sometimes happens that in cold weather the milk may be delivered to the dealer more or less frozen. If such is the case, detach the ice from the side of the can and gently heat the contents until the ice is *all* melted. If there is much ice in the can it is absolutely necessary to do this before selling the milk, otherwise the liquid part dipped out and sold at first will contain more of the solid part of the milk and cream, while the ice remaining and consisting principally of water, will after a time melt, and the result will be milk containing more water than pure milk, and this might be enough to appear as though the milk had been adulterated with water.

"Do not place ice in the milk if it is desired to cool it or keep it cold, as the ice will melt and you will then have adulterated the milk with water.

"Milk shall not be kept for sale or stored in any room used for sleeping or domestic purposes or opening into the same.

"Milk must not be transferred from cans to bottles or other vessels on streets or on ferries or at depots, except when transferred to vessel of purchaser at time of delivery.

"Milk shall not be sold in bottles except under the following rules:

"Bottles must be washed clean with a hot water solution of soap, or soda or some other alkali, and then with hot water before filling with milk.

"Bottles must not be filled except at the dairy or creamery, and in the city only in rooms so situated as to prevent the contamination of the milk by dust from the streets or other impurities."

"Bottles must not be washed or filled with milk in any room used for sleeping or domestic purposes or opening into the same."

The rules of the board of health of Little Rock, N. Y., require that every person delivering milk "shall prevent the temperature thereof rising above sixty-two degrees by the use of ice, covered conveyances or preferably by the use of separate bottles kept on ice."

The following rule in regard to conveyances was adopted in Milwaukee:[1]

"No person or persons shall bring to or deliver milk in the City of Milwaukee, for the purpose of retailing the same to consumers in the City of Milwaukee, in any open or uncovered wagon, cart or conveyance of any kind; and all milk hereafter to be brought to the City of Milwaukee to be retailed to consumers, or for that purpose to be delivered in the City of Milwaukee, shall be brought to said city and delivered therein in cans so constructed that the covering hereinbefore provided for shall fit on the same, and with the cans or vessels containing the milk and shall protect such milk and the cans or vessels containing the same from the sun and rain, and so that no dirt shall enter in with the dust and the impurities of the air."

In Penn. Penn the wagons must be equipped with covers in June, July, August, and September. In Indianapolis milk on the way to dealers must be covered with covers.

[1] Milwaukee ordinance of October 18, 1886, No. 4.

The committee appointed by the Massachusetts Association of Boards of Health prepared with great care some rules on this subject which in a slightly modified form have been adopted in Boston:[1]

"No person in the City of Boston engaged in the business of producing milk for sale, and no person engaged in the business of storing or delivering milk in said city, shall store, cool or mix said milk in any room which is occupied by horses, cows or other animals. All rooms in which milk is stored, cooled or mixed, shall be provided with tight walls and floor and kept constantly clean. The walls and floors of said rooms to be of such a construction as to allow easy and thorough cleansing. The room or rooms aforesaid shall contain proper appliances for washing or sterilizing all utensils actually employed in the storage, sale or distribution of milk, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after being so used.

"No urinal, water-closet or privy shall be located in the rooms called for in the preceding section, or so situated as to pollute the atmosphere of said rooms.

"All milk produced in the City of Boston for sale shall be strained, cooled or stored as soon as it is drawn from the cow."

The danger of the spread of contagious disease through the agency of milk naturally receives far more attention from health officers than from dairy officials. Though the danger from this source is not great, relative to the amount of business done, yet in the aggregate it is considerable, and a large number of outbreaks of typhoid fever, scarlet fever, and diphtheria have been traced to contaminated milk vessels or infected milkmen.[2] There is considerable legislation found in regard to infected milk, though very little of it is statutory. The following is the New Jersey law:[3]

"That when the state board of health, or any officer thereof, duly authorized in writing by such board to act for or on behalf of said board, shall have reason to believe that any milk has been contaminated by the emanations, exhalations or discharges of any person sick with communicable disease, it shall be lawful for the said state board of health, or the officer so authorized to act in the premises, to prohibit the transportation or sale of any milk suspected to be contaminated as aforesaid, and also to prohibit the transportation or sale of any milk which may be produced, stored, kept or found upon any premises infected by such disease; such prohibition shall continue until the state board of health, or the officer authorized to act in the premises as aforesaid, shall in writing remove such prohibition."

Regulations intended to prevent the spread of contagious disease through the agency of milk are found in the rules of the Illinois, Iowa, and North Dakota state boards of health, and of Boston, Buffalo, Chicago, Colorado Springs, the District of Columbia, Milwaukee, Omaha, St. Louis, and other cities, but the best provisions that the writer has seen,

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[1] Boston, Rules of Board of Health, 22 December, 1898.

[2] The District of Columbia, Report of Health Officer (1895), p. 299.

[3] New Jersey, Chapter 374 of 1895.

are those proposed by the Massachusetts Association of Boards of health.[1]

Some of the rules, as those of Iowa and North Dakota, absolutely forbid the sale of milk from premises where there is contagious disease. In Brookline, Mass., no person with phthisis can be employed in the milk business.

In Chicago milkmen are notified of contagious diseases among their customers. The use of tickets for the payment of milk is forbidden in Gardner, Mass., Little Rock, N. Y., Meadville, Pa., and Richmond, Ind.

To insure compliance with its rules, the Philadelphia board of health has added to its rules[2] that

"Failure or neglect to comply with the foregoing rules and regulations will subject the offender to the seizure of his or her cows and their delivery to the Guardians of the Poor in accordance with the provisions of the act of April 5, 1849."

PASTEURIZED MILK.

As soon as the danger of feeding to infants milk rich in bacteria was recognized, the attempt was made to overcome the difficulty by sterilization; but it was soon found that this rendered the milk less digestible, and that nearly as good practical results could be obtained by a partial sterilization at lower temperature, by which all but the most resistent germs would be destroyed, and at which temperature the milk would be only slightly altered. This pasteurization like sterilization was first done in private families on the advice of physicians, but soon certain dairymen took up the practice in order to meet the demand of the better class of their customers who called for it on their physicians' advice. At present there are in most large cities private dealers or dairymen who supply a limited demand for pasteurized milk. The advantages of pasteurized milk as an infants' food are so great, and the

[1] Journal of Massachusetts Association of Boards of Health, Vol. VII., p. 122:

"Every person engaged in the production, storage, transportation, sale, delivery, or distribution of milk, shall immediately, on the occurrence of any case or cases of infectious disease, such as typhoid, scarlet fever or diphtheria, either in himself or in his family, or amongst his employees or within the building or premises where milk is stored, produced, sold, or distributed, take care that the local board of health is notified of such case or cases, and at the same time suspend the sale or distribution of milk until authorized to resume the same by the local board of health.

"It shall be unlawful for any person suffering from a contagious or infectious disease, such as typhoid fever, scarlet fever, or diphtheria, to handle, transport, deliver, mix, taste, work over, or distribute milk, or in or about places where milk is stored, sold, or distributed, or to serve as a milker or milkman. No vessels which have been handled by persons suffering from such diseases shall be used to hold or convey milk."

[2] Philadelphia, Report of Board of Health (1895), p. 278.

chances of the poor who need it most, appreciating it and paying for it are so slight, that the necessity for its distribution quickly appealed to the hearts of the charitable. The distribution of pasteurized milk at a price below cost has become a feature of the charitable work in New York, Brooklyn, Cleveland, Rochester, Yonkers, and other cities. The most important of these charities is that conducted by the Hon. Nathan Strauss of New York and begun by him in 1893.[1] Through the efforts of Mr. Strauss 596,677 bottles of pasteurized milk were distributed in 1900. He also furnished a certain amount of milk modified according to the formula of certain well known physicians. During the years that his milk has been coming into use, there has been a decided falling off in infant mortality in New York, and it is claimed that it is due to that cause. Similar reports are sent out from Brooklyn.[2]

Rochester is the only city so far as the writer knows where such distribution of milk has been undertaken by the health department. An account of the method employed in that city may be found in the report of the health department for 1897, p. 13, from which the following extracts are taken:

"We, therefore, established a milk depot in one of the most populous districts of the city where we supplied milk in nursing bottles, ready for feeding, after the plan of Siebert, of New York City, slightly modified to meet the small fund available for this purpose. For this depot we had a large, light, newly-papered, clean store with counters dividing it in half. In the rear of the counter a long work table, gas stove, large sink and large refrigerator were placed. A supply of four and eight ounce nursing bottles and corks, together with au Arnold sterilizer, capable of holding six dozen bottles and the necessary cleaning appliances, etc., completed our outfit. At this depot was stationed a nurse, whose services were donated by the Rochester City Hospital. A woman to wash bottles assisted the nurse.

"The milk was received from cows that had passed the tuberculin test and who were daily groomed, well fed, and watered, and their udders well washed. The cows were inspected by our milk inspector. The milk was received in squat twelve quart cans belonging to the department. These cans were sterilized for forty-five minutes in the steam sterilizer and then sealed. Around the neck of these cans was placed a wide rubber band and a sterile paper envelope containing two squares of sterile cheese cloth sufficient to cover the mouths of the cans. Through one of these cloth squares the cow was to have been milked directly into the sterilized can. When the milking was finished, the first piece of cloth was to have been thrown away and the second piece placed over the mouth of the can, while the can was placed in ice water to cool. When the milk was received at the depot it was immediately prepared, Pasteurized, and put up in bottles as indicated in Siebert's table.

"When a mother came to the depot for milk, the nurse, in the absence of direction from a physician, advised about the general care of her child, using the little pamphlet as a guide. If the mother was nursing her child, the nurse endeavored to have her continue to do so, if the age, weight, and general devolopment of the child seemed to indicate that it was best. If the child was a bottle-fed child, the nurse

[1] Forum, November, 1894, and circular letter of Nathan Strauss, 15 Nov., 1900.

[2] Brooklyn, Report of Health Department (1896), pp. 55 and 89.

weighed the child, and, in the absence of any direction from the physician, directed the mother how to feed it. The milk was sold in nursing bottles only, at the uniform price of about two cents per pint, the cost of the milk. No milk was sold by measure. Milk was only sold after the weight and general development of the child had been observed by the nurse.

"The difficulty of securing clean milk to start with was an almost insuperable obstacle to the success of the project.

"Notwithstanding the care taken to sterilize the milk cans, the bottles, corks, and everything that could possibly come in contact with the milk, the difficulties in producing a clean milk supply were very great. When our milk station was started, one of the most intelligent and painstaking milk producers in this section was asked to supply us with milk. Specific directions were given to him as to just how the milk should be put into our cans. Our cans after they were sterilized, closed and sealed, were to be sent to his dairy. The cows' udders were to be washed, and milked directly into our cans; the cans were to be covered with a double thickness of dairy cloth and placed in ice water to cool. We found upon examination that those directions were not being carried out. The cows were being milked into the milkman's own cans, the milk put into a cooler, stirred with a piece of broomstick, poured into our cans, which were allowed to stand open, and sent to our milk depot for distribution. Some of the milk that came to us was absolutely bad. Upon finding this state of things we immediately stopped getting milk from this man, and upon advice of our milk inspectors selected a man whom they thought, out of all the milk producers sending milk into the city of Rochester, would be the man best calculated to give us a good, clean milk supply. Our further observation proved that this was not so. Inspections by our milk inspectors of this stable showed that the milkmen were milking with dirty hands into their own pails in a dusty stable; that they were leaving our sterilized milk cans open, and upon several occasions we received milk, with a dusty, cowey taste, and on one occasion milk that was sour.

"These experiences have taught us that the only way in which we can secure a good milk supply for little children is to rent our own cows, rent a stable and pasture for the season, and produce our own milk under conditions over which we have absolute control."

In Rochester in 1899, there were five stations with a nurse at each station. The nurses were paid $10 per week and four cents per quart was paid for the milk. The total cost was about one cent per bottle. About 40,000 bottles were distributed to 100 children, most of whom were sick. The milk that was purchased averaged under 25,000 bacteria per c. c. Excellent work of a similar character has been done in Yonkers under the direction of Dr. S. E. Getty.

STATUTES CONSULTED IN THE PEPARATION OF THIS CHAPTER.

ALABAMA. Butter, Chapter 408 of 1895 and 597 of 1897.
ARKANSAS. Butter, Statutes (1894), Secs. 1586–90.
CALIFORNIA. Butter, Chapters 75 of 1897 and 25 of 1899.
Cheese, Chapter 76 of 1897.
Dairy bureau, Chapters 38 of 1897, 75 of 1897 and 136 of 1899.
Milk, Chapter 136 of 1899.
COLORADO. Butter, Annotated Statutes (1891), Chapter I, Secs. 1–8.
Dairy Commissioner, (butter and milk), Chapter 19 of 1895.
Milk, Act of 17 April, 1893, Secs. 69–72.

CONNECTICUT. Butter, Chapters 114 of 1893 and 32 of 1895.
Dairy Commissioner, Chapter, 114 of 1893.
Milk and butter, General Statutes (1888), Secs. 14–63.
Milk Inspectors, Chapter 209 of 1899.
DELAWARE. Butter, Chapter 209 of 1895.
DISTRICT OF COLUMBIA. Butter, Act of 25 January, 1879.
Milk, Act of 2 March, 1895.
FLORIDA. Butter, Chapter 328 of 1881.
GEORGIA. Butter and cheese, Act of 16 December, 1896.
Milk, Act of 16 December, 1895.
IDAHO. Butter, Act of 6 March, 1899.
ILLINOIS. Butter and cheese, Annotated Statutes (1896), Chapter 38, Secs. 19–35; Act of 14 June, 1897.
Milk, Annotated Statutes (1896), Chapter 38, Secs. 37–42; Rules of State Board of Health, 30 September, 1895; Act of 7 June, 1897.
INDIANA. Milk, Statutes (1897), Secs. 2191–2.
Butter, Statutes (1897), Secs. 2171a.
IOWA. Dairy products, Code (1897), Secs. 2515–28.
Milk, Code (1897), Secs. 4989–91.
KANSAS. Milk, General Statutes (1897), Secs. 322–3.
KENTUCKY. Butter, Statutes (1894), Sec. 1283.
Milk, Statutes (1894), Sec. 1274.
LOUISIANA. Butter, Act of 8 July, 1886.
MAINE. Butter and cheese, Revised Statutes (1883), Chapter 128, Secs. 3–6.
Milk, Revised Statutes (1883), Chapter 38, Secs. 44–7.
Chapters 20 of 1887, 255 of 1893 and 292 of 1897.
Testing Milk, Chapter 169 of 1895.
MARYLAND. Butter and cheese, Public General Laws (1888), Art. 27, Secs. 88-91; Chapter 604 of 1890.
Milk, Chapter 306 of 1898.
MASSACHUSETTS. Butter and cheese, Public Statutes (1882), Chapter 56, Sec. 17 et seq. Chapters 310 of 1884, 317 of 1886, 356 of 1885, 58 of 1891 and 340 of 1890.
Dairy bureau, Chapters 412 of 1891 and 280 of 1894.
Milk, Public Statutes (1882), Chapter 57; Chapters 310 of 1884, 352 of 1885, 318 of 1886, 425 of 1894, 264 of 1896; condensed milk, 169 and 223 of 1899.
MICHIGAN. Butter and cheese, Compiled Laws (1897), Secs. 5013-17; Chapters 147 and 254 of 1899.
Milk, Compiled Laws (1897), Secs. 11,412-25; Chapter 106 of 1899.
MINNESOTA. Dairy products, Chapters 94, 257, 295 of 1899.
Milk, Statutes (1894), Secs. 6992–7005.
Milk, powers of cities, Chapter 203 of 1895.
MISSISSIPPI. Butter, Code (1892), Sec. 1242.
MISSOURI. Butter and cheese, Revised Statutes (1899), Secs. 2270–6.
Milk, powers of cities, Revised Statutes (1899), Sec. 6165.
MONTANA. Butter and cheese, Penal Code (1895), Secs. 684–6, Political Code, Sec. 4064.
Milch cows, Penal Code (1895), Sec. 1095.
NEBRASKA. Butter and cheese, Compiled Statutes (1899), Secs. 3211–3211g.
Milk, Compiled Statutes (1899), Secs. 6898, 6940.
Food Commission (1899), Secs. 3207 and 3211g.
NEVADA. Butter, Compiled Laws (1900), Secs. 4906–8.
Milk, Compiled Laws (1900), Secs. 4897–4901.
NEW HAMPSHIRE. Dairy products, Public Statutes (1891), Chapter 127; Chapters 37 of 1893, 115 of 1895 and 58 of 1899.

NEW JERSEY. Butter and cheese, General Statutes (1895), p. 1167, Secs. 4–22. p. 1167. Secs. 23–28, p. 1169, Secs. 29–30.
Milk, General Statutes (1895), p. 1169, Secs. 3, 33–43, 51–54, 65–66; Chapters 152 of 1897 and 182 of 1898.
Dairy Commissioner, General Statutes (1895), p. 1169, Sec. 31–2, p. 1177, Sec. 91.

NEW YORK. Butter and cheese, Revised Statutes (1895), p. 38 (Agricultural Law. Secs. 20 et seq.); Chapter 149 of 1899.
Milk, Revised Statutes (1895), p. 38, (Agricultural Law, Sec. 20 et seq.): Chapter 153 of 1898.
Commissioner of Agriculture, Revised Statutes (1895), p. 38, (Agricultural Law. Secs. 1–12.

NORTH CAROLINA. Butter, Chapter 106 of 1895.

NORTH DAKOTA. Dairy products, Chapter 49 of 1895, and 72 of 1899.

OHIO. Butter, Annotated Statutes (1900), Secs. 4200(–14), *et seq.*
Milk, Annotated Statutes (1900), Secs 4200(–9), *et seq.*

OKLAHOMA. Dairy products, Compiled Statutes (1893), Sec. 2443.

OREGON. Milk, Annotated Laws (1892), Chapter 36, Secs. 3, 13.
Dairy products, Act of 25 February, 1893.

PENNSYLVANIA. Butter and cheese, Brightly's Purdon's Digest (1894), p. 1621. Chapter 234 of 1895.
Milk, Brightly's Purdon's Digest (1894), p. 1332, Chapter 118 of 1897.
Cheese, Chapter 164 of 1897.
Renovated Butter, Chapter 121 of 1899.
Dairy Commission, Brightly's Purdon's Digest (1894), p. 1621.

RHODE ISLAND. Butter, General Laws (1896), Chapter 146.
Milk, General Laws (1896), Chapter 147, and Act of 13 May, 1896.

SOUTH CAROLINA. Dairy products, Act of 9 March, 1896.

SOUTH DAKOTA. Butter, Chapter 65 of 1897.

TENNESSEE. Butter, Chapter 101 of 1895.

UTAH. Butter and cheese, Revised Statutes (1898), Secs. 734–46.
Milk, Revised Statutes (1898), Secs. 731–3, Chapter 34 of 1898.
Dairy Commission, Revised Statutes (1898), Secs. 2446–50.

VERMONT. Butter and cheese, Statutes (1894), Secs. 4332–7.
Milk, Statutes (1894), Secs. 4327–30, 4975, Chapter 81 of 1898.

VIRGINIA. Butter and cheese, Code (1887), Secs. 1900–1, Chapters 526 of 1891–2, and 146 of 1897–8.
Milk, Code (1887), Sec. 1899, Chapter 526 of 1891–2, Sec. 3.

WASHINGTON. Butter and cheese, Code (1899), Secs. 2844–7, Chapter 43 of 1899.
Milk, Code (1899), Secs. 2842–3, 2851–4.
Dairy Commission, Code (1899), Sec. 2848 *et seq.*

WEST VIRGINIA. Butter and cheese, Code (1899), Chapter 150, Sec. 20a.

WISCONSIN. Butter, Statutes (1898), Sec. 4607c–e, Chapter 76 of 1899.
Milk, Statutes (1898), Secs. 4607-b, Chapter 313 of 1899.
Food Commission, Statutes (1899), Secs. 1410–10d.

CHAPTER IX.

COMMUNICABLE DISEASES.

Legislation.

IN one sense the prevention of the importation of communicable diseases, or quarantine service, is the most important work of the health officer. That prevention is better than cure is as true of the outbreak of disease in a community as it is of its attack on the individual; but after all, it is only in comparatively few instances that quarantine can be successfully invoked. It is only at seaports that maritime quarantine can be enforced, and inland quarantine is of use in only the rarer diseases, so that very few health officers really have any quarantine duties to perform and most of them only give a part, and often a small part of their time to them; but there are few boards of health which do not have some of the commoner forms of communicable diseases constantly present, so that the problem of how to deal with communicable diseases actually existent occupies a large part of the attention of sanitary authorities and is the important problem with which they have to deal. The attempt to check the spread of communicable diseases by proper management is no new thing and was made in early colonial times. During the smallpox outbreak in Massachusetts Bay in 1678, the town officers of Boston [1] and Salem [2] adopted measures of isolation and disinfection not unlike what would be employed at the present time. From that time to the present our town and state governments have continued to practice and to improve methods of control, not only of smallpox, but of an increasing number of other communicable diseases.

The local management of communicable diseases is usually left in the hands of the local authorities, county or municipal, but sometimes it is assumed by the state government and more rarely by the federal government. In Florida, where the local boards of health have been abolished, the control of communicable diseases must be in the hands

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[1] Boston, Record Commissioners' Reports, Vol. 7, p. 119.

[2] Act of Salem Selectmen, 18 October, 1678.

of the state officers. In other states the state authorities are to take charge of outbreaks under certain circumstances. Thus in Mississippi:[1]

"When yellow fever or other epidemic or contagious disease shall make its appearance, the state board of health shall take charge of the infected district or locality and enforce such rules and take such measures as it may deem necessary to prevent the spread of the disease or to suppress it."

And in Massachusetts:[2]

"If smallpox or any other contagious or infectious disease dangerous to the public health exists, or is likely to exist in any place within the state, the state board shall investigate the same, and the means of preventing the spread thereof, and shall consult thereon with the local authorities, and shall have co-ordinate powers as a board of health, in every place, with the board of health or health officer thereof, or with the mayor and aldermen or the selectmen, if no such board or officer exists in such place."

In a few other states, as Maryland, Minnesota, North Carolina, and Ohio, it is provided that in emergencies the state board of health shall assume control of outbreaks of communicable diseases,[3] and as was shown on page 5, the state board of health in several states is authorized to exercise executive functions in those communities where the local authorities fail. Furthermore in many states the state board of health is established as an advisory board, and in almost all states local health officers are accustomed to call on the state board of health for advice and assistance in outbreaks of communicable diseases and not infrequently the state board is invited to take entire charge.

Even in such a state as Massachusetts, which probably contains more efficient local boards than any other state, the advice of the state board is frequently called for even in such cities as Lowell, Newburyport, and Springfield. The board, owing to the increase in this work, has recently detailed a medical man as special inspector. It is his duty to visit all towns which apply for advice in regard to communicable diseases and

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[1] Mississippi, Annotated Code (1892), Sec. 2279.

[2] Masssachusetts, Public Statutes (1882), Chapter 80, Sec. 2.

[3] Ohio, Annotated Statutes (1900), Sec. 2143:

"The state board of health, or the board of health of any city, village or township, in time of epidemic, or threatened epidemic, may establish a quarantine on vessels, railroads, stages, or any other public or private vehicles conveying persons, baggage or freight, or used for such purpose, and may make such rules and regulations as may be deemed wise and necessary for the protection of the health of the people of the community or state. Such quarantine and rules and regulations, when established by a local board of health, after careful investigation by the proper officer of the state board of health, may be altered, relaxed, or abolished by the order of said state board of health, and thereafter no change shall be made except by order of the state board of health, or to meet some new and sudden emergency. (O. L., vol. 90, March 14, 1893.)"

in some cases when the board learns that the local officers do not seem able to cope with the outbreaks the state board takes the initiative.

It is, however, more in accord with American principles of government that the control of communicable disease should be entirely in the hands of local officers, and in the vast majority of cases it is so. The local sanitary authority is established chiefly for this purpose, and in very many states the law expressly confers the necessary executive and legislative authority, and requires strict performance of duty on the part of the local officers. Local sanitary officers are authorized to maintain isolation, to remove to a hospital, to disinfect, and often to carry out the rules and directions of the state board of health. An example of a rather full narration of such powers and duties is found in Maine.[1]

Sometimes the authority is granted in less specific terms, as in New Jersey.[2]

The powers above given are very broad, but they are broader still for certain cities. The extraordinary powers given to the board of health in the City of New York will be noted in connection with the consideration of epidemics, and in addition that board is authorized in such emergencies to spend $80,000 in excess of its appropriation.[3] Similar provisions are found in Buffalo[4] and Pennsylvania cities of the second class,[5] and certain cities which have been given very broad san-

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[1] Maine, Chapter 123 of 1887, as amended by Chapter 139 of 1895:

"SEC. 7. III. To guard against the introduction of contagious and infectious diseases, by the exercise of proper and vigilant medical inspection and control of all persons and things coming within the limits of its jurisdiction from infected places, or which for any cause, are liable to communicate contagion; to give public notice of infected places, by displaying red flags or by posting placards on the entrances of the premises; to require the isolation of all persons and things that are infected with, or have been exposed to, contagious or infectious diseases, and to provide suitable places for the reception of the same; and to furnish medical treatment and care for persons sick with such diseases who cannot otherwise be provided for; to prohibit and prevent all intercourse and communication with, or use of, infected premises, places and things, and to require, and, if necessary, to provide the means for the thorough cleansing and disinfection of the same before general intercourse therewith, or use thereof, shall be allowed. And it shall be its duty to report to the state board of health promptly, facts which relate to infectious and epidemic diseases, and every case of smallpox, varioloid, diphtheria, and scarlet fever, occurring within the limits of its jurisdiction."

[2] New Jersey, General Statutes (1895), p. 1644, Sec. 49, III:

"To prevent the spreading of dangerous epidemics or contagious diseases, and to declare that the same has become epidemic, and to maintain and enfore proper and sufficient quarantine whenever deemed necessary."

[3] New York, Chapter 378 of 1897, Sec. 1177.

[4] New York, Chapter 105 of 1891, Sec. 236.

[5] Pennsylvania, Act of 26 June, 1895, Sec. 28.

[illegible] statute have conferred the same upon their board of [illegible] commissioner, as St. Louis[1] and Chicago.[2]

While the executive control of communicable diseases is chiefly in [illegible] the local health authorities, it is not so with legislation. [illegible] diseases are largely dealt with by statutory legislation, [illegible] is also a great amount of municipal law-making on this [illegible].

[illegible] the following states have some restrictions applicable to communicable diseases upon their statute books. These states are Nebraska, [illegible] Kansas, Oregon. This statement has no reference to quarantine regulations.

[illegible] a number of states have given their state board of health authority to make regulations in regard to communicable diseases. It is recognized that the framing of rules for the management of communicable diseases requires a high degree of technical knowledge and also that the science of preventive medicine and our knowledge of these diseases is advancing rapidly, and laws on this subject need frequent revision. The following states give the state board of health authority to make regulations in regard to contagious diseases: Florida, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, New Hampshire, North Dakota, Ohio, South Dakota, Tennessee, Vermont, Virginia, Wisconsin; but in Maryland and Missouri this power is only to be exercised in serious outbreaks. Such rules have been adopted in Florida, Indiana, Iowa, Mississippi, Missouri, North Dakota, Ohio, South Dakota, Vermont, Wisconsin. But in Wisconsin such rules have been declared unconstitutional by the Supreme Court.[3]

While legislative power is thus exercised by the legislature and conferred upon the state board of health in many states, in no instance is it withheld from the local units of government. Counties or municipalities, or both, can in all states make rules in regard to communicable diseases. When cities or boards of health can make rules "in regard to health" they can certainly make rules in regard to communicable disease, so that any general grant of legislative power in sanitary matters would involve the power to make rules concerning the subject that we are now considering. In a few states only, as Connecticut, Illinois, New Hampshire, New Jersey, New York, North Carolina, and in a few cities, as Baltimore and Providence, does the local government

[1] St. Louis Ordinances (1893), Chapter 14, Sec. 436.

[2] Chicago Municipal Code (1881), Sec. 1189.

[3] Wisconsin Supreme Court, 23 February, 1897. State *ex rel.* Adams *vs.* Burdge *et al.*, School Board.

depend on such general provisions. In most states authority is expressly given to make regulations in regard to communicable diseases. Thus in Maine[1] "towns may establish by-laws for protection against contagious diseases." In Massachusetts[2] the board of health shall make regulations concerning "causes of sickness" and concerning "articles which are capable of containing or conveying infection or contagion, or of creating sickness." In Alabama[3] "the court of county commissioners · · · may make such rules and regulations as are necessary to prevent the introduction and spread of contagious or infectious diseases." Although Pennsylvania has as explicit statute law as any state for the prevention of communicable diseases, nevertheless, power is given to local boards of health to supplement the state law with rules of their own.[4]

Sometimes authority to make these rules is granted to the local sanitary authorities, as in Massachusetts and Pennsylvania above, and sometimes to the township, city or county, as in Alabama and Maine, in which case of course the ordinances are enacted by the representative legislative assembly of the township, city or county as the case may be.

Having thus noted the statutory basis for the regulation of contagious diseases we may proceed to consider the regulations actually in force and the means taken to secure their enforcement.

Reports of Communicable Diseases.

Before the health officer can do anything to prevent the spread of communicable disease he must be aware of its existence. As early as 1721[5] the colony of Rhode Island provided that tavern keepers should report cases of communicable disease, and in 1743[6] the law was enacted in nearly its present form. Similar laws were enacted in the other colonies, and from that time until the present the report of smallpox to the local authorities has been compulsory. It was not however until

[1] Maine, Revised Statutes, Chapter 14, Sec. 36.

[2] Massachusetts Public Statutes, Chapter 18, Sec. 18.

[3] Alabama, Civil Code (1896), Sec. 1515.

[4] Pennsylvania, Chapter 124 of 1895, Sec. 19:

"The health authorities of the several municipalities of this Commonwealth shall, and they are hereby authorized and empowered to establish rules and regulations regarding the isolation of persons who may be suffering from any of the diseases mentioned in section four of this act, and for the destruction, disinfection and fumigation of bedding, clothing or other infected articles, and for the disinfection and fumigation of houses and premises, and for the carrying out of the provissions of this act, as they may in good faith declare the public safety and health demand, which rules and regulations they may from time to time alter or amend."

[5] Rhode Island Digest of 1730, p. 119.

[6] Digest of 1745, p. 274.

the latter half and almost the last quarter of the nineteenth century that the notification of the more common communicable diseases was generally required.

At present the following states have state laws requiring the report of communicable diseases: Alabama, Colorado, Connecticut, Florida, Georgia, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Washington, West Virginia, Wisconsin, and Wyoming have statutes covering the subject, while Indiana, Iowa, Mississippi, New Hampshire, North Dakota, South Dakota, Ohio, Texas, Vermont, have regulations made by the state board of health, and Mississippi, New Hampshire, Ohio, and Vermont have both. In the states which do not by state law require the report of communicable diseases there are many communities which have made it a part of their local regulations. Thus it is required by the model sanitary regulations of New York and has been adopted by all the principal cities and by a large number of the smaller communities in that state.

Persons Required to Report.

The physician who attends a case of communicable disease is expected to have the first and best knowledge of the case, and it is he who in every instance is required to report it to the authorities. The following is the wording of the law in Pennsylvania:[1]

". . . That every physician located or practicing in any of the municipalities of this Commonwealth who shall know that any person whom he or she is called upon to visit or who comes or is brought to him or her for examination is suffering from or is afflicted with cholera, smallpox, etc. . . ."

When more than one physician has been called to a case, the case is sometimes not reported as each physician may think the other has fulfilled the law. This is guarded against by the sanitary code of the City of New York.[2]

In Camden[3] it is provided that reports of communicable disease by physicians shall be confidential, but how the subsequent necessary steps

[1] Pennsylvania, Chapter 124 of 1895, Sec. 1.

[2] The City of New York, Sanitary Code, 1899:

"Sec. 145. That every physician shall report to the Sanitary Bureau, in writing, every person having a contagious disease (and the state of his or her disease, and his or her place of dwelling and name if known), which such physician has prescribed for or attended for the first time since having such a contagious disease, during any part of the preceding twenty-four hours; but not more than two reports shall be required in one week concerning the same person; but every attending or consulting physician thereat must, at his peril, see that such report is or has been made by some attending physician."

[3] Camden, Sanitary Code 1894, Sec. 11.

for the control of the case can be taken and this provision be respected, it is difficult to see. But it not infrequently happens that a physician is not called, and sometimes this is intentionally done so that the case may not be reported. Consequently it is often required that the head of the household or any person having a knowledge of the case shall report. Usually the responsibility is laid conjointly on both the physician and the head of the household, but in New Hampshire, New Jersey and Wisconsin the latter is only required to report when there is no physician in attendance. The "head of the family" is made responsible in Alabama, Kentucky, Ohio, and Vermont, the "head of the household" in Tennessee; the "householder" in Colorado, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, North Carolina, Rhode Island, and Wisconsin, and the "tenant" in Michigan. Any person knowing of a case of contagious disease is required to report in Georgia, Indiana, Minnesota, North Dakota, Rhode Island, and New York City. In Ohio "the owner or agent of the owner of any building in which a person resides" is responsible. Many of the old laws required inn keepers to report, and this is true at present of the laws in Michigan, Minnesota and New York City. In Minnesota, "every keeper of any private house, boarding house or lodging house and every inn keeper and hotel keeper . . . and every person knowing of any person sick with contagious disease shall report the same."[1] In Buffalo "the nurse or midwife in charge" and "the officer in charge of any public institution," in Denver "any policeman," in St. Louis "the police department," in Reading and Rochester "the nurse," in Albany and Fitchburg the "parent or guardian," in Atlanta any "citizen," and in Chicago "any other person hearing of a case" are required to report.

Examples of other municipal regulations are given below.[2]

[1] Minnesota Chapter 132 of 1883, Secs. 22–3.

[2] New Orleans, Ordinances No. 4916, Administration Series 1879, Art. 455(21):

"The coroner or coroners, or his or their deputies, masters of any water-craft, boarding or lodging house keepers, principals or masters of any boarding schools or seminary, and all practitioners of medicine, surgeons, obstetricians or physicians, apothecaries, chemists, druggists, midwives and all persons who use or pretend to use medical, obstetrical or surgical means for the treatment of disease, disorder or lesion, are hereby required, each, any, or all of them, as the case may be, to report to the board of health, of the State of Louisiana, all cases of contagious, infectious, epidemological diseases, especially cholera, yellow fever, trichinosis, typhus or ship fever, smallpox, diphtheria, or any of the grades of such diseases, or any others that may be specified by the board of health, or may be generally adjudged contagious or infectious, within twenty-four hours after the same may come under their treatment, cognizance or supervision."

Minneapolis, Ordinance of 25 June, 1897, Sec. 4:

"Every proprietor, manager, superintendent, principal, owner, agent, or other person in charge of any hotel, boarding house, boarding school, tenement house or

Rules like that of New York shown below are found in many maritime cities and several inland cities, as Denver, Memphis, and Omaha[1] have applied the principle to railroad trains.

While many persons beside the physician are thus made responsible, it is he who is chiefly looked to for official information of communicable diseases, and it is he who reports nearly all recognized cases. Legal action for failure to report is rarely brought against any one other than a physician. Occasionally, however, the law is by the local board of health enforced against the head of the family. Thus in Fitchburg[2] during an outbreak of measles in 1897 over half the cases were reported by parents. In Boston both parents have been fined $100 for failure to report.

While the great majority of cases of communicable disease are treated by physicians, and if the notification laws are enforced are reported by them, it is undoubtedly the small minority of unreported cases which do the most harm in spreading the disease. Hence health officers have made great efforts to get at these cases. Often the inspector of the department, while making his visits, learns of cases in the neighborhood, cases which have not received a physician's care, either because of intention to conceal the case or because of careless neglect. School teachers often learn of cases, and for many years it has been the practice in Fitchburg, Oakland, Cal., Providence, and other

other place of residence, or of any hospital, asylum or other public institution within said city, in which any contagious or infectious disease may be discovered, shall give immediate notice to the department of health of said city of the existence therein of such contagious or infectious disease, and of the name or names of the person or persons affected therewith."

New York, Chapter 378 of 1897, Sec. 1251:

"Every master, owner or consignee of a vessel lying at a wharf or in the harbor of the City of New York, shall make a like report, and within the same period, of the name of every sick person on board of such vessel."

[1] Omaha, Rules of the Department of Health, Rule 5:

"Whenever any person on any railroad train coming into Omaha shall show symptoms indicating an attack of small-pox or other contagious disease, or whenever any such facts shall come to the knowledge of the conductor or the person in charge of any such train, as shall lead him to suppose that any person on his train is attacked with small-pox, or is infected with the disease, it shall be his duty, before he shall have reached a point within five miles of the city limits, to telegraph such fact to the mayor or commissioner of health, and whenever it shall be impossible to send such telegram, said conductor, or person having such train in charge, and having a person on board so suspected by him of having the small-pox or other contagious or infectious disease, shall detain such person on the train on reaching Omaha until he shall have notified the mayor or commissioner of health, or some officer of the health department thereof of such fact, and until a reasonable time shall have elapsed after such notice for the health department of the city to take charge of such person."

[2] Fitchburg, Report of Board of Health (1897), p. 32.

cities to supply the public school teachers with cards similar to those furnished physicians to report to the health department any suspicious cases of communicable disease that they may hear of. These cases are then investigated by the inspector. In Iowa[1] a rule requiring reports from teachers has recently been adopted.

Teachers are also required to report in Cincinnati,[2] Minneapolis,[3] Omaha,[4] New Orleans,[5] and the City of New York,[6] and in the latter city the rule is made applicable to teachers in private schools, night schools and Sunday schools. Boston improved upon this plan by establishing in 1894 a daily medical inspection of schools. This will be more fully considered in another connection, and it is sufficient here to state that many cases of communicable disease are thus found and isolated, which would otherwise have mingled freely with the other pupils, and doubtless often served as the starting point of outbreaks.

In most instances the physician or other person is to report cases occurring in the city, township, county, or other sanitary district to which the law applies, but in St. Louis cases within twelve miles of the city, in Omaha within three miles, and in Memphis within one mile, are to be reported.

Officers to whom Report is Made.

In almost all cases the reports are to be made to the health authorities, though in some of the older laws it is otherwise. Thus in Rhode Island the report is to the "town council," in Iowa to the "mayor or township clerk," in Georgia and Florida (where there are no local boards of health) to the mayor or county commissioner, and also to the state board of health in Florida, and in Mississippi and New Orleans reports are to be made to the state board of health, in Pennsylvania and Tennessee to the health authorities, in Alabama, Colorado, Connecticut, Florida, Maine, Michigan, North Carolina, and Vermont to the health officer, but in most of the laws the report is to be made to the board of health. In Brooklyn reports were to be made to the inspectors of the district where the case resided.

[1] Iowa, Rules of the State Board of Health, Feb. 24, 1899, Rule 4:

"Every school teacher who discovers among his or her pupils a case of these contagious diseases, must immediately report the fact to the mayor or township clerk, as the case may be; also, to the superintendent or principal of the school, and to the parents of the children, and must send the pupils thus afflicted to their homes at once."

[2] Cincinnati, Manual of Health Department (1898), Sec. 69.

[3] See p. 431.

[4] Omaha, Rules and Regulations of Board of Health (1892), Sec. 13.

[5] See p. 431.

[6] New York, Rules of the Board of Education (1899), Sec. 68.

How Made.

Often no reference is made to the manner in which the report shall be sent. In a good many regulations, however, it is required that it be in writing, as in Connecticut, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, and North Dakota. In Maine the "notice shall be given either at the office of the health officer or by a communication addressed to him and duly mailed within the time specified"; in New Hampshire it "shall be given verbally to one of the health officers," or else mailed. In Washington "the notices required may be sent by mail or except in the case of cities, may be given to or left at the residence of any member of the board of health."

The writer has seen no reference in the rules to the use of the telephone as a means of reporting cases of contagious disease, but it is often used. In Providence physicians are requested to use the telephone when they can conveniently do so, and more than half the reports are received in that way, and much time is thereby gained. This practice in that city is steadily increasing. The report as received is at once recorded on a blank form like that used for mail reports and the hour of reception and name of receiver noted. In Buffalo, where the tariff for telephone use is so much per message, the health department pays the cost of the message. In Newark the use of the telephone is discouraged, partly because as a payment of ten cents is made for each return a written report is desirable as evidence, and second because it is claimed that there is greater liability to error in the use of the telephone; but the experience of Providence shows that as many mistakes are made in writen as in telephonic reports.

Time for Making Reports.

It is desirable to have reports of communicable diseases made as promptly as possible, hence in Maryland, Massachusetts, Michigan, New Hampshire, Rhode Island, and Washington they must be made "immediately" or "at once." In Texas the time is six hours, in Connecticut, Ohio, Paterson, and St. Louis it is twelve hours, and in Iowa, Kentucky, Maine, Minnesota, North Carolina, North Dakota, and Wisconsin, twenty-four hours. In New York City[1] and in several cities which copy from it, boarding-house keepers shall within six hours notify the health department, if a seafaring man has been taken sick at their house.

The following rule is found in Reading and some other Pennsylvania cities[2] and in Wilmington, Del.:

"Such report shall be made within six hours after knowledge of such case or cases occurring between six o'clock a. m. and six o'clock p. m., or within eighteen

[1] New York, Sanitary Code (1899), Sec. 150.

[2] Reading, Rules and regulations, Board of Health (1896), Sec. 7.

hours, if knowledge of such case be received between six o'clock p. m. and six o'clock a. m."

In Bradford, Pa.,[1] the report is to be made in three hours, or if after six P. M. before nine o'clock the next morning. In Camden and Paterson deaths from communicable disease are to be reported in three hours and six hours respectively, while cases are to be reported in twenty-four hours and twelve hours. In Washington the physician is liable to a penalty only after the lapse of forty-eight hours. In San Antonio[2] boxes of printed cards for the report of communicable diseases are left at various drug stores and collections are made from these stores twice each day by the police.

Most of the state laws require physicians and others to report cases of communicable diseases of which they may "know." This is true of the laws in Indiana, Michigan, Minnesota, North Carolina, Pennsylvania, South Dakota, Vermont, and Washington. In Michigan and Minnesota they are to report cases of which they are "informed" or "which they hear of." A more important provision is found in Florida, Indiana, New Hampshire, Oklahoma, Rhode Island, and South Dakota, namely, that "suspected" cases shall be reported. A physician or other person is not to wait until fully satisfied as to the diagnosis, but is to report the cases as soon as suspicion arises that it may belong to the list requiring notification. If it is desired to restrain persons who have the virus of the disease in their person though they may not be sick, it is necessary that all communicable disease laws should specifically mention "infected" as well as "sick" persons, but this as yet has not often been done.

The following definition is from the District of Columbia:[3] "'A case of contagious disease' shall be held to mean any person suffering from any such disease. Any person shall be held to be suffering from a contagious disease who is so infected by such disease as to be capable of transmitting it to others. The presence of the ordinary clinical symtoms of any contagious disease shall be *prima facie* evidence that such case is or was such a disease; and the presence in such case of the specific bacteria of such disease shall be conclusive evidence that such case is or was such disease."

In a few cities, as Albany,[4] report is to be made of any persons "exposed to such contagious disease." Usually the statutes and regulations require the report of every case of communicable disease, and the Minneapolis rules specify that not only the first, but subsequent cases

[1] Bradford, Rules of Board of Health, Sec. 72.

[2] San Antonio, Report of Department of Health, 1898, p. 18.

[3] The District of Columbia, Act of Congress, 3 March, 1897, Sec. 1.

[4] Albany, Rules and Regulations, Board of Health, 1892, Sec. 2.

in a family shall be reported. In Providence where the medical inspector maintains supervision of the family, the rule in regard to requiring reports from physicians of secondary cases is not enforced, and little inconvenience results. In some cities physicians are required to report to the health department when the patient has recovered. In Mobile also in cases of yellow fever a daily report is required from the physician.

Diseases to be Reported.

In most regulations the diseases to be reported are specifically named, but always there is an additional requirement that communicable diseases in general shall be reported. This broad provision is variously worded. Thus "pestilential or infectious" diseases are to be reported in Alabama; diseases "dangerous" or "dangerous to the public health" in Colorado, Massachusetts, Michigan, Wisconsin, and Vermont; "contagious or infectious diseases" in Connecticut, Massachusetts, Maryland, New Jersey, Rhode Island, and South Carolina; "contagious diseases" in Indiana, Minnesota, Vermont, and Wisconsin; "epidemic diseases" in Kentucky; "virulent contagious diseases" in Mississippi; and the diseases named by the state board of health in New Jersey, Ohio, and Washington, and "communicable diseases" in New Jersey and Tennessee. In West Virginia "epidemic" diseases are to be reported. In Connecticut and Tennessee "venereal diseases" are excepted from the contagious diseases to be reported. In St. Louis "malignant" diseases are included in the rule.

Besides the requirement as to the class of diseases to be reported, most laws specifically mention the diseases which it is intended shall be covered by the law. Usually the local health authorities insist upon the report of such diseases as are specifically named and ignore the requirement of the law as to other communicable diseases. If circumstances require the report of another disease not specifically mentioned, or of a new disease, the health authorities usually give ample notice that such disease is to be reported before any action is taken against a person for failure to report. In a few states as Alabama and South Carolina no diseases are mentioned by name. The following are the diseases that are usually specifically named as coming under the notification law in American states and cities:

Smallpox. Nearly every notification law specifically mentions smallpox as a disease to be reported, and the laws of Rhode Island[1] and Georgia[2] mention no others.

[1] Rhode Island General Statutes 1896, Chapter 94, Sec. 15.

[2] Georgia Code 1895, Sec. 1856.

Cholera. Nearly as many states mention this disease as smallpox, Maryland, Massachusetts, Minnesota, and North Carolina being the exceptions.

Scarlet Fever is named in the following state laws, viz.: those of Colorado, Connecticut, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, South Dakota, Washington, West Virginia, and Wisconsin.

Diphtheria is mentioned in same states as scarlet fever.

Croup or Membranous Croup is to be reported by the laws of Connecticut, Indiana, Iowa, Maine, Maryland, New Hampshire, New Jersey, and Pennsylvania.

The recognition of the fact that a large proportion if not all cases of membranous croup are really diphtheria is somewhat recent, and as city councils or boards of health are usually less conservative than state legislatures, it is not surprising that a number of cities require the report of croup, although it is not required by their state law. This is true of Albany, Boston, Brookline, Mass., Cambridge, Chicago, Cincinnati, Cleveland, Fitchburg, Grand Rapids, Haverhill, Holyoke, Kansas City, Lowell, Lynn, Macon, Memphis, Minneapolis, Newburg, New Bedford, Newport, R. I., New York City, Omaha, Providence, Salem, St. Louis, Seattle, Spokane, Springfield, Mass., Wilmington, and Youngstown, O. It was formerly reported in Newton, Mass., but is not now, owing to the objections of physicians.

Sore Throat. Since it has been demonstrated that diphtheria is due to the diphtheria bacillus, it has been clear that many cases of apparently benign sore throat are really diphtheria and are not only dangerous to the patients themselves but to the public. The advantage of having all cases of sore throat submitted to bacteriological examination, as is done by the best educated physicians is manifest. In Providence the attempt was made to require the report of sore throats, but at the earnest solicitation of the medical profession it was abandoned. In Spokane the rule given below has been adopted.[1]

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[1] Spokane, Ordinances, Number A. 661, 2 October, 1896, Sec. 1:

"That whenever any person shall know of the existence of any diphtherial symptoms, and whenever any guardian, parent or person who has charge of any child, children or other person, and such child, children or other person shall show indications of sore throat or other diphtherial symptoms, such guardian, parent or person having the charge or control of any child, children or other person shall immediately report the same to the health officer or a member of the board of health of the City of Spokane; and any guardian, parent or other person having charge of any child, children or person, either temporarily or permanently, who shall fail, refuse or neglect to comply with the provisions of this ordinance, or shall fail, refuse or neglect

It was also ordained at the same time that the board of health should investigate such cases, but that section was repealed.

Yellow Fever is named in the following state laws: Connecticut, Florida, Indiana, Kentucky, Mississippi, New Hampshire, New Jersey, North Carolina, Ohio, Tennessee, and Vermont.

Typhus Fever has not been very common of late years, although it is serious enough when it does occur. It is to be reported in Connecticut, Maryland, Indiana, Maine, New Hampshire, New Jersey, North Carolina, Ohio, and Vermont.

Typhoid Fever is required in physicians' reports in only a few states, viz.: Connecticut, Iowa, Maine, Maryland, New Hampshire, New Jersey, and Ohio. The reason for this probably is that stringent methods of isolation or disinfection are not usually adopted in these cases. The chief value of the reports of typhoid is that they often enable the sanitary officers to discover in the milk or water supply the source of an outbreak and thus to check its spread. Such work, however, is much more often possible and necessary in cities than in the country, so that most cities have thought it wise to require reports of typhoid. Typhoid is not reported in the District of Columbia, Dayton, Jersey City, Memphis, Omaha, St. Paul, Terre Haute, and Toledo.

Measles is to be reported in Indiana, Iowa, Maryland, New Hampshire, Ohio, South Dakota, Utah, and in the following cities: Chicago, Indianapolis, Kansas City, New Bedford, Newburgh, New Haven, Newport, Newton, New York, Omaha, Portland, Me., Portland, Ore., Raleigh, Rochester, St. Louis, San Antonio, San Francisco, Savannah, Scranton, Seattle, Spokane, Syracuse, Terre Haute, Toledo, Utica, Worcester, Yonkers, and Youngstown.

Whooping Cough is to be reported by the laws of Iowa, Maine, Maryland, and Utah, and in the following cities: Chicago, Cincinnati, Cleveland, Columbus, Grand Rapids, Haverhill, Minneapolis, Mobile, New Bedford, Portland, Raleigh, St. Louis, San Antonio, Scranton, Seattle, Spokane, Toledo, and Youngstown.

Phthisis or Consumption. Much discussion has arisen as to the advisability of requiring reports of this disease and physicians have not very generally approved of it. Nevertheless it is required in Maine, Michigan, and a considerable number of cities. Among these are Alameda, Cal., Asbury Park, Boston, Buffalo, Cincinnati, New York City, Salt Lake City, Trenton, and Yonkers.

In Washington, Asbury Park, Minneapolis, San Francisco, and Syracuse, "tuberculosis" is to be reported.

to comply with all the orders of the health officer or physicians appointed by him or the board of health, shall be punishable by a fine not exceeding one hundred dollars

The rule in regard to reporting consumption in New York City is given below.[1]

Cerebro-spinal Meningitis is to be reported in Indiada, Pennsylvania, Buffalo, Evansville, Fitchburg, Holyoke, Mass., Jersey City, Lynn, Michigan, Minneapolis, New York City, Portland, Me., Raleigh, Rochester, St. Louis, San Antonio, Spokane, Utica, and Yonkers.

Chicken Pox is to be reported in Albany, Baltimore, Cincinnati, Grand Rapids, New York, Raleigh, and St. Louis. In Boston, during outbreaks of smallpox, the board of health requires reports of chicken pox, and probably under such circumstances it is required in other cities.

Leprosy is to be reported in California, Connecticut, Iowa, Maine, New Jersey, North Carolina, and Pennsylvania.

Hydrophobia in animals is considered in connection with diseases of animals. When it occurs in man, it is to be reported in Ohio and in Scranton.

Erysipelas is to be reported in Detroit, New York City, Portland, Ore., Rochester, and St. Louis, and "epidemic erysipelas" in Ohio.

Mumps is to be reported in Maryland, Grand Rapids, and Raleigh.

Puerperal Fever is to be reported in Iowa, Ohio, Chicago, Grand Rapids, Raleigh, Rochester, St. Louis, and Utica.

Relapsing Fever is to be reported in Pennsylvania, Buffalo, Rochester, Utica, and Yonkers.

Dysentery in "epidemic" form is to be reported in Ohio. It is also reported in Scranton.

German Measles is to be reported in Seattle.

Trichinosis is to be reported in New Jersey and North Carolina.

Plague is to be reported in District of Columbia and New Jersey.

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[1] The City of New York, Sanitary Code 1899, Sec. 153:

"That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in this city to report to the Sanitary Bureau in writing the name, age, sex, occupation and address of every person having such disease who has been attended by or who has come under the observation of such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent or physician of each and every public or private institution or dispensary in this city to report to the Sanitary Bureau in writing, or to cause such report to be made by some proper and competent person, the name, age, sex, occupation and last address of every person afflicted with this disease who is in their care or who has come under their observation within one week of such time. It shall be the duty of every person sick with this disease and of every person in attendance upon anyone sick with this disease, and of the authorities of public and private institutions or dispensaries, to observe and enforce all the sanitary rules and regulations of the board of health for preventing the spread of pulmonary tuberculosis."

Pneumonia is to be reported in Hartford.

Glanders is to be reported in Detroit, District of Columbia, and Scranton.

Malaria is to be reported in Oakland, Cal.

Form of Report. Very many of the statutes prescribe the items which shall be given when reports of a case of communicable disease are sent to the health department. In Pennsylvania[1] the physician shall

"Forthwith make report in writing or upon blanks to be furnished for that purpose, to the health authorities of the municipality in which said person may be located, which said report shall, over his or her own signature, state the name of the disease and the name, age and sex of the person suffering therefrom, and shall also set forth by street and number, or otherwise sufficiently designate the house, room or other place in which said person may be located, together with such other information relating thereto as may be deemed important by said health authorities."

As in the above Pennsylvania law, provisions are found in other statutes and local regulations that blank forms for reports shall be furnished by the health authorities. Whether or not this is specified in the laws, it is the general custom. In Newark, however, since a fee has been paid for returns, blanks are not furnished, but this is not approved of by the health department. These blanks are distributed to physicians and others by the local health authorities and are usually furnished by them, but sometimes, as in Vermont and South Dakota, they are furnished by the state board of health. Generally the blanks are in the form of a postal card with the address printed on the face. Sometimes, as in Mobile and Philadelphia, a letter sheet is used. Examples of forms are shown in Appendices 51–6. It will be seen from these that the number of items varies considerably. It is probable that the fewer blanks the physician has to fill, the more prompt and complete will be the returns.

Sometimes cities furnish unstamped cards or plain sheets for these reports in order that they may be mailed in an envelope. This is sometimes done at the request of physicians who do not wish a chance reader to be informed of the case. When stamped return letter sheets were furnished by the post office department they were used for reports in Albany. In some cities, as Milwaukee and Savannah, the blanks are furnished in pad form with a stub which may be filed and kept by the physician as a memorandum. Occasionally, as shown in the appendix, special forms are used for special diseases.

Payment for Reports. This is rarely made and there are judicial decisions which show that it is not necessary.[2] Nevertheless it has

[1] Pennsylvania, Chapter 124 of 1895, Sec. 1.

[2] Connecticut Supreme Court, 1 December, 1887. State *vs.* Nathaniel E. Wordin.

been considered advisable by some states and cities to make a small payment for such reports. Michigan and New Jersey have such provision in their laws and the amount in each is ten cents for every report. In Newton, Mass., the same fee is paid.

False Reports. Great injury might be done by the false report of a communicable disease but no penalty for such has been noted; the following from Reading[1] might be applied:

"No physician shall intentionally, in his reports to the Board, exaggerate the number of cases of contagious disease under his care."

False rumors are forbidden by the Florida statute:[2]

"Any person or persons who shall falsely or maliciously disseminate or spread rumors or reports concerning the existence of any infectious or contagious disease, shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished as provided by section 765.

Reports to the State Board of Health. Besides the states of Florida and Mississippi which require reports direct to the state board of health, a number of states require reports of communicable diseases from local boards to the state board.[3] Other states than these secure such reports either by voluntary action of the local boards or because the general reports which local boards are required to make include returns of communicable diseases. In some cases reports are to be made by telegraph. In Wisconsin the health officer may use the mail or telegraph as he sees fit. In Vermont reports of cholera, smallpox, typhus and yellow fever are to be telegraphed. In Massachusetts cases of smallpox are to be reported to the state board in twenty-four hours. In Washington smallpox, cholera, yellow fever and typhus are to be reported in three days. In Illinois the first case of smallpox, typhoid fever, cholera or yellow fever, shall be promptly reported to the state board and the prevalence and progress of any epidemic disease shall be promptly reported. In Tennessee, Michigan, and New Hampshire the first case of an outbreak is to be promptly reported, and in New Hampshire and Michigan its subsequent progress is to be reported weekly. The forms used in New Hampshire are shown in Appendices 57–58.

In New Jersey weekly reports are required. These are on cards and are filed alphabetically, and also recorded by tally in a large book so that the state board of health can easily keep informed of the amount of communicable disease in all parts of the state. In Connecticut, South

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[1] Reading, Rules and Regulations of the Board of Health, Sec. 8.

[2] Florida, Revised Statutes (1892), Sec. 766.

[3] Connecticut, Illinois, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, North Carolina, Ohio, South Dakoto, Tennessee, Washington, West Virginia, New York, Wisconsin and Vermont.

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ever, diphtheria, scarlet
officer of such town or
disease. In case he shall find evi-
from some other town or
officer of such other town
disease was brought from such

their state board of
wa, Indiana, Louisiana,
New Hampshire, Ohio, South
Maine and South Caro-
those states the following
Bridgeport, Boston,
N. J., Providence, Newton,
Spokane, Springfield, Mass.,
Cambridge, Fitchburg, Haverhill,
San Francisco, Worcester, District
Sacramento, Norwich, Conn., Buffalo,
S. C., Knoxville, Baltimore, Cam-
Paterson, Pawtucket, R. I., Portland, Ore.,
Allegheny, Reading, Scranton and Troy.

A great many smaller places of which the writer has knowledge also use placards. The only cities which he has visited, or with which he has corresponded, which do not placard at all are Hartford, Richmond, Wheeling, Wilmington, Del., and Augusta, Ga. In New Haven however, the health officer informed the writer that he did not consider the practice a good one and in Philadelphia many of the medical profession are strongly opposed to it. On the other hand it is the experience of the writer that nothing which is so little trouble to the health department and causes so little hardship to the family is productive of such good results.

In Richmond placards were formerly used, but are not now. In New York City placards are used only on stores and tenement houses. In Chicago it is at the option of the attending physician whether houses are placarded or not; it is not done if he assumes the responsibility of isolation. In Mobile notices are used only for smallpox. In Atlanta, according to the rule, scarlet fever is placarded only where there is absence of isolation. In Philadelphia[1] the rule is that houses are not to be placarded when a guard has been placed or when the responsible head of a family guarantees isolation.

In some states, as in New Hampshire, it is provided that all communicable diseases (which require notification) shall be placarded. This of course includes typhoid, but it is probably not generally done in this disease. Indeed there is no reason why cases should be so designated.

Every city and state which specifies what diseases shall be thus designated, names smallpox, scarlet fever, diphtheria, and croup (if reported). Cholera is named in Iowa, New Hampshire, Indiana, North Carolina, Vermont, and South Dakota, and St. Louis, Pittsburgh, Memphis, and Philadelphia. Typhus fever is named in Ohio, New Hampshire, North Carolina, Pittsburgh, and Philadelphia, and yellow fever in Louisiana, North Carolina, Ohio, Vermont, Philadelphia and some southern cities. It is probable that besides smallpox, scarlet fever, diphtheria and croup, nearly all health officers would placard cholera, typhus or plague or else put a guard around the house or remove it to a hospital. The public in any event would surely be warned, which is one of the purposes of the placard.

The chief contention is in regard to measles. Warning signs are perhaps not usually employed in this disease, but they are required by the laws of Iowa, Michigan, New Hampshire, Ohio, and Vermont, and are recommended by the state board of health of Maine, and they are used in Bloomfield, N. J., Central Falls, R. I., Kansas City, Leomin-

[1] Philadelphia, Rules of Board of Health (1895), Sec. 93.

ster, Mass., Lowell, Macon, Ga., Minneapolis, Newton, Mass., Norwich, Conn., Pawtucket, R. I., Pittsburgh, Rhineland, Wis., and Rochester, but most if not all of the other cities mentioned on page 442 do not use a placard for this disease.

Mumps are placarded in Cleveland.

Cerebro-spinal meningitis is placarded in Philadelphia and St. Louis.

Chicken pox is placarded in Cincinnati, and in Columbus, O., but in the latter city the card merely states "contagious disease within."

Whooping cough is to be placarded in Kansas City and Michigan.[1]

In most communities it is the duty of the health officer or other executive officer to place the warning sign upon the house or to cause it to be so placed. This is made one of his duties in most of the statutes and rules as in that of Minnesota given below; but in South Dakota "the county board of health shall cause the attending physician to see that the proper cards or flags of warning" are placed on the house. In Atlanta, Bridgeport, Grand Rapids, and Newark the occupant is to placard the house.

In Wells County, Indiana, when there is doubt as to the nature of a disease and contagion is suspected, the card shown below is placed on the house until the diagnosis is established.[2]

It is generally provided as in the Minnesota law that the sign shall not be removed without the permission of the health officer, and it is to be kept up of course, as long as it is deemed necessary to maintain isolation. A penalty is imposed for removing the card, but as may well be imagined, it can rarely be enforced, as it is extremely difficult to secure evidence necessary to convict. The provisions of the Minnesota law making the occupant responsible are intended to accomplish the desired object in a better way.[3]

[1] Michigan, State Board of Health Report (1896), p. 30.

[2]

NOTICE.

KEEP OUT. CONTAGION POSSIBLY WITHIN.

Five Dollars Fine for Removing this Card.

DR. BROGE S. HORNE,
County Health Officer.

[3] Minnesota, Chapter 133 of 1897:

"No person or persons shall deface, alter, mutilate, destroy, tear down or remove any such notice posted as aforesaid without the permission of the commissioner of health or health officer who posted the same; and the occupant and person having possession or control of any house or building upon which such

The occupant is also made responsible by the ordinances of Chicago, Denver, Memphis, and Milwaukee. In Buffalo the occupant is to notify the health department if the sign is illegally removed. In Bradford, Pa.,[1] if the placard is removed the board of health shall publish the name of the head of the family together with the location of the house.

Warning signs are to be furnished by the sanitary authority and this is specified in most of the laws and rules and is doubtless the universal practice.

The place where the warning sign is to be posted is often specified. In Minnesota it is "on or near the house." In Indiana, Iowa, Lynn, New Hampshire, and Ohio, in a conspicuous place, in Rochester in a conspicuous place near the main entrance, in Reading and Scranton on the front door or in a conspicuous place, in North Carolina, South Dakota, Camden, Cincinnati, Cleveland, and Paterson, on the front of the house. It is apparently intended in most regulations that one sign shall suffice, but in North Dakota,[2] Holyoke, and Providence the card is placed on all entrances. In a few cities the warning sign is not placed on the outside of the house, but only on the apartment in which the sick person is to be isolated, the isolation in such cases to be absolute.[3]

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notice shall be placed or posted as aforesaid shall within twenty-four (24) hours after the destruction or removal of any notice placed or posted on his house or building as aforesaid, notify the commissioner of health or proper health officer of such destruction or removal of the notice.

The fact of the alteration, destruction or removal of any such notice shall be prima facie evidence that such notice was so altered, destroyed or removed, as the case may be, by the occupant and person having possession and control of the house or building on which such notice was placed or posted."

[1] Bradford, Rules of the Board of Health, Sec. 74.

[2] North Dakota, Rules of State Board of Health, 20 May, 1899:

"The health officer shall give notice to the public of the danger of infection from such disease, in the house or building, by placing placards with the name of the disease upon such, in large and distinct printed letters, on the outer walls of the house or building, close to the front, rear and other entrances.

[3] Milwaukee, Ordinances, Chapter 104 of 19 September, 1892, amending Sec. 196 of Chapter 14 of 1891:

. . . "Provided, however, that in all cases where any person residing in any hotel, tenement house or other building, in which more than one family reside, may be infected with any of the diseases herein mentioned, the commissioner of health may in his discretion cause such notice to be placed upon the door of the room occupied by such person, or upon some other door or doors in or to such building, and the occupant, manager or lessee of such building shall be subject to the same duties and to a like fine of any violation thereof as are herein imposed upon the occupants of such houses where such notice is placed upon all the outside doors of the same."

Similar provisions are found in Denver and Newton, Mass., and, in the latter city, if the card is removed it shall be then placed on the front door, or above the latter at the discretion of the health commissioner.

In Boston if isolation in one room or apartment is complete and satisfactory, the card is placed on the inner door, if isolation is not satisfactory the patient is removed to the hospital. If the patient cannot be moved to the hospital the card is placed on the outside. In Newark and the District of Columbia the apartment only is placarded.

The form, size and wording of the warning sign are frequently prescribed in the regulations and vary very greatly in different cities. "Flags" are used instead of cards in Atlanta, Camden, Indianapolis, Macon, Mobile, and New Orleans. In Reading a "patch," presumably a piece of cloth, is prescribed. Usually a card is to be put up. The largest that have come to the notice of the writer are those ordered in Macon which are 24″ by 28″ and by the Iowa state board of health, 18″ square. The form recommended by the Pennsylvania state board of health is 9″ by 18″, in Minneapolis they are 11″ by 13″, in Indiana and South Dakota 12″ square, in New Hampshire 6″ by 9″. Those used in Providence are 5″ by 7″ and about that size is very commonly used. The smallest cards are used in several Massachusetts cities as Boston, Cambridge, Everett, and Fall River; those in Cambridge are $3\frac{1}{2}$″ by $5\frac{1}{2}$″. A very long card 7″ by 24″ is used in Defiance, O., for scarlet fever and one $4\frac{1}{2}$″ by 12″ in Denver for diphtheria.

The colors of the cards vary as much as the size. In Pennsylvania, Utah, Baltimore, Bridgeport, Fall River, Lynn, Milwaukee, Newark, New Haven, Newton, Philadelphia, Raleigh, San Francisco, and Seattle, the same color is used for all diseases. Sometimes this is black on white as in San Francisco and Seattle, sometimes red on white as in Fall River and Newark, and again black on yellow in Utah, Baltimore, New Haven, and Philadelphia. More often, however, different colors are used for different diseases.

For smallpox in Rhode Island, the sign shall be of white with smallpox in black letters six inches high. It is to be in red in Macon and Reading; yellow in Portland, Ore., and Mobile. For scarlet fever red is usually employed if distinguishing colors are used, sometimes it is black on red ground, and sometimes red on white ground. In the District of Columbia the color is pink. In Providence white on red ground is used. It is difficult, however, to get a red card or red ink which will stand sun or rain without fading.

For diphtheria and croup in Providence black on white is used as it is in Boston, Cambridge, Denver, and New York. In New Hampshire, District of Columbia, Macon, and Taunton blue is the color chosen, and

green in Portland, Ore. Usually the same color is used for croup and diphtheria, but in New Hampshire they are of different colors. In Newark different colors were formerly used for diphtheria and croup, but it has been deemed best to use the diphtheria card for croup.

For measles white is used in Macon, yellow in New Hampshire.

The signs usually contain in prominent letters the name of the disease, and a warning to persons not to enter the house and a warning not to remove the card. In Denver all but the name of the disease is in very small letters. Often a section of the law is added. Examples of various styles of placards are shown in Appendices 59–64.

In many cities the cosmopolitan character of the population requires that cards should be printed in different languages. Often only the language predominating in the neighborhood is used, though sometimes two languages are used on the same card, as in Buffalo, where the matter is printed in both English and German. In Fall River an English and a French card are posted. In Brooklyn formerly cards were printed in English, Italian, Hebrew and German, but only one was as a rule used on a house. The cards were printed with one language on one side and another on the other so as to lighten by one-half the weight of cards carried by the inspector.

Cards are usually fastened to the woodwork of the house with tacks, and in Providence copper tacks are used so as not to deface the house by rust. In many cases in that city the card is simply placed between the curtain and the inside of the glass of the front door. In Philadelphia the warning signs are gummed on the back and are moistened and stuck to the house by the inspector. As might be inferred, they are not infrequently washed off by the rain.

Usually if disinfection is done by the sanitary officials, the warning sign is removed at that time, but in Jersey City it is to be left up for twenty-four hours longer.

Isolation.

The isolation of communicable disease is sometimes prescribed by statute or by rules of the state board of health, but more often by local regulations.[1]

In some of these laws the provisions are very general, as in North Dakota,[2] where

"The health officer shall at once, after receiving such notification, see that the patient is completely isolated from all other occupants of the house or building, or removed to a hospital for such cases."

[1] "Isolation is directed by the statutes of Arizona, Florida, Idaho, Iowa, Maine, Maryland, Michigan, Mississippi, Montana, New Hampshire, New Jersey, Nevada, North Carolina, Rhode Island, Virginia, and by the state board of health rules of Indiana, Mississippi, New Hampshire, North Dakota, Ohio, and Vermont."

[2] North Dakota, Regulations of the State Board of Health, Sec. 2.

In some states the force of the statute is weakened by imposing a penalty only for wilful failure to maintain isolation, as in Michigan and Mississippi. The statute in Maine is much more explicit.[1] The Rhode Island law is superior in omitting the word wilful, but is very defective in not providing that in the case of minors the parents shall be responsible.[2] As the majority of cases of communicable diseases are in children, this is a serious defect.

Some of the other statutes like that of Rhode Island leave the decision as to isolation in the hands of the local health officer by requiring a permit from him for ingress or egress. In Colorado the health officer is to order isolation, in Idaho, the county board of health, and in Florida the state health officer. Sometimes, as in Ohio,[3] the statute without ordering isolation authorizes the local board to enforce it.

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[1] Maine, Chapter 123 of 1887, as amended by Chapter 139 of 1895:

"SEC. 11. No householder in whose dwelling there occurs any of the above-mentioned diseases, shall permit any person suffering from any such disease, or any clothing or other property to be removed from his house, without the consent of the board, or of the health officer, and the said board, or health officer, shall prescribe the conditions of removal.

"SEC. 12. No parent, guardian, or other person, shall carelessly carry about children or others affected with infectious diseases, or knowingly or willfully introduce infectious persons into other persons' houses, or permit such children under his care, to attend any school, theatre, church or any public place.

"SEC. 15. Persons recovering from smallpox, scarlet fever, diphtheria or cholera, and nurses who have been in attendance on any person suffering from any such disease, shall not leave the premises till they have received from the board of health, or health officer, a certificate that they have taken such precautions as to their persons, clothing, and all other things which they propose bringing from the premises as are necessary to insure the immunity from infection of other persons with whom they may come in contact, and no such person shall expose himself in any public place, shop, street, inn or public conveyance without having first adopted such precautions."

[2] Rhode Island General Laws, Chapter 94, Sec. 24:

"Every person in any house where there is any one sick with the smallpox or other contagious or infectious disease, or who is in any smallpox hospital, who shall voluntarily leave the same without a permit from the town council or the physician employed by such town council, or from the superintendent of health in cities, shall be fined twenty dollars and be imprisoned not exceeding ninety days."

[3] Ohio, Annotated Statutes (1900), Sec. 2117:

"And when complaint is made, or a reasonable belief exists, that an infectious or contagious disease prevails in any house or other locality, the board may cause such house or locality to be inspected by its proper officers, and on discovering that such infectious or contagious disease exists, may, as it deems best, send persons so diseased to the pest-house or hospital, or may restrain them and others exposed within said house or locality from intercourse with other persons, and prohibit ingress or egress to or from such premises."

Occasionally, as in New York City, the statute peremptorily directs absolute isolation.[1]

Most of the isolation of communicable diseases is however done under local regulations adopted by the legislative bodies of cities, townships, counties, etc., or by the board of health. Local governments, as we have seen, almost always have ample powers granted them to legislate "in regard to health" or to "prevent disease." Such powers have generally been exercised, and wherever there is an established sanitary authority to enforce them and sometimes where there is not, regulations are framed prescribing with more or less minuteness for the isolation of cases of communicable diseases. A section from the New York code with very general provisions is given below.[2]

Laws and regulations directing the isolation of persons infected with communicable diseases may be exceedingly strict, even requiring the absolute separation from the outside world of the whole household or family, as in the provisions of the charter of New York City quoted above. It is not, however, to be supposed that it was intended that the law should be enforced exactly as it reads, and it certainly is not so enforced, though such might be done in cholera, plague or smallpox. It is not every contagious, infectious or pestilential disease that public opinion would permit to be so treated, and in the opinion of many such stringent measures are not necessary. Instead of ordering complete isolation of the whole household in all cases of communicable disease, laws and regulations may either prescribe under what circumstances and to what extent isolation shall be maintained, or they may leave the details of each case to the board of health or health officer or to the inspector. Or perhaps some of these matters may be decided by the laws and others left to the discretion of the executive officer.

In most cases the statutes and in many cases the local regulations do not go into details in regard to the diseases to be isolated and the

[1] New York, Chapter 378 of 1897, Sec. 1219:

"It shall be the duty of the board of health to forbid all communication with the house or family infected with any contagious, infectious, or pestilential disease except by means of physicians, nurses, or messengers to carry the necessary advice, medicines, and provisions to the afflicted."

[2] New York City, Sanitary Code (1899), Sec. 167:

"That no person shall within this city, without a permit from this department, carry, remove, or cause or permit to be carried or removed, any person sick with smallpox or other contagious disease, or remove or cause to be removed, any such person from any building or vessel to any other building or vessel or to the shore, or to or from any vehicle in any part of the city. Nor shall any person, by any exposure of any individual sick of any contagious disease, or of the body of such person, or by any negligent act connected therewith, or in respect of the care or custody thereof, or by a needless exposure of himself, cause or contribute to, or promote the spread of disease from any such person, or from any dead body."

strictness and the length of the isolation. These matters are very often discretionary with the health officer or the inspectors. It is therefore not easy to determine what is the practice in different communities for the details of isolation can only be partially learned from a study of printed regulations. It is very often necessary to personally examine into the methods adopted.

Isolation of the Patient when removed to a Hospital. For the more dangerous communicable diseases as smallpox, typhus fever, cholera, yellow fever, and plague most boards of health and health officers require the complete isolation of the patient in the room. For the more common diseases as scarlet fever and diphtheria it is usually recommended and often required. The Boston rules are most explicit[1]

The card shown below is used on the door of the infected apart-

[1] Boston. Rules of the Board of Health, July, 1894.

"1. Whoever is infected with smallpox, scarlet fever, diphtheria or membranous croup shall immediately proceed to the isolated place or room designated by the board of health, and no person who has been so affected shall leave such place or room, and no article shall be removed from such place or room, until the board of health shall certify in writing that all danger of communicating such disease to others is passed.

"2. Every parent or guardian of any child or ward infected with smallpox, scarlet fever, diphtheria or membranous croup shall immediately cause such child or ward to be conveyed to some isolated place or room approved by the board of health, and no parent or guardian shall permit such child or ward to remove from such place or room until the board of health shall find and certify in writing that all danger of communicating such disease to others has passed.

"3. No person other than the attending physician, nurse and agents of the board of health shall enter any apartment or other place set apart for the treatment of smallpox, scarlet fever, diphtheria or membranous croup until the board of health shall certify in writing that such apartment or place has been satisfactorily disinfected.

"4. No person having the care of any other person who has been affected with smallpox, scarlet fever, diphtheria or membranous croup shall advise or permit such other person to leave any place designated by the board of health as a place of isolation of such infected person before said board of health shall have certified in writing that such person can leave such designated place without danger to others.

"5. No physician who has been in attendance upon any person who has been infected with smallpox, scarlet fever, diphtheria or membranous croup shall advise or knowingly permit such person to leave any place designated by the board of health as a place of isolation of such infected person before said board of health shall have certified in writing that such infected person can leave such place without danger to others."

[1] SIZE 6 x 10½ INCHES.

DIPHTHERIA.

This door opens to an apartment designated and set apart by the Board of Health, City of Boston, for the isolation of a patient suffering from diphtheria.

ment. In Newton this card has upon it a copy of the rules. Similar regulations are found in Salem,[1] Newton,[2] Lynn,[3] Fitchburg,[4] Newark, Rochester, and for smallpox, yellow fever, typhus fever and cholera in the District of Columbia.[5]

An examination of most of the circulars concerning communicable diseases issued by boards of health will show that this isolation in one room is always recommended even when it is not prescribed. Sometimes, as in Cleveland and Providence, isolation for the patient is ordered only under certain conditions, as when the wage-earner is allowed to go to work and such isolation is necessary to keep him apart from the patient. While it is easy enough to order such a separation of the sick, it is a very difficult matter to enforce it. The writer doubts if it can be done, unless there is a pretty constant supervision on the part of the sanitary officers. There is certainly no other way of knowing that the order is enforced. Such supervision is not, however, generally maintained. Then again among persons of small means who live in from two to four rooms and perhaps have a large family, it is impossible to secure such isolation as is ordered by the Boston rules before given. It is necessary to remove to the hospital cases occurring under such conditions. This is done very frequently in Boston (in about fifty per cent. of all cases), but few other cities have the facilities to care for many hospital patients. It appears to be doubtful therefore, if more than a minority of cases of communicable diseases occurring in the average American community are really isolated in one room, rules and orders notwithstanding.

Sometimes the rules make no pretence of keeping the sick person in one room, but only forbid egress from the house.[6] The keeping of the infected person in the house is another matter, and it is doubtless required and usually secured. Moreover, there is no good reason why with ample grounds and no near neighbors, he may not go out of the

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[1] Salem, Report of Board of Health (1896).

[2] Newton, Rules of Board of Health (1894), Sec. 11.

[3] Lynn, Rules of Board of Health (1896), p. 5, Sec. 3.

[4] Fitchburg, Rules of Board of Health (1897), p. 18, Sec. 5.

[5] District of Columbia, Act of Congress, 3 March, 1897.

[6] Denver, Ordinance 44 of 1893, Sec. 4:

"All persons having smallpox or any contagious or infectious disease in the city, or within five miles of the city, who shall refuse to go or cannot be taken to a place prepared or designated for them, are hereby required to be kept closely confined within their respective dwellings or places of abode, and to obey such rules and regulations as may be adopted by the health commissioner in the premises, and such orders as may be issued by the said commissioner under the law and ordinances of said city."

house upon the grounds surrounding it. During convalescence this would often be better both for the patient and for the house and its other inmates. Public opinion is, however, strongly against this, and it is rarely permitted except under very favorable conditions in rural districts. Most of the regulations refer to the "sick" person, but of late the expression "person infected" is used, and sometimes there is added "who has recently had" the disease.

Isolation of the Family. When cases of the more dangerous communicable diseases, as smallpox, typhus, cholera and yellow fever cannot be removed to a hospital, the complete isolation of the family is invariably required. A number of cities in their rules require more stringent measures for these diseases than for scarlet fever, diphtheria, measles, etc., as Buffalo, Cincinnati, Cleveland, the District of Columbia, Macon, Reading, and Wilmington; and probably all boards of health insist upon it, even if it is not commanded by the rules. In scarlet fever and diphtheria isolation of persons other than the sick is by no means invariably required. It is probably the general rule that the children in such families shall be kept in the house; it is so in Baltimore, the District of Columbia, Newark, Pittsburgh, Providence, Wilmington, and, of course, also in all cities where absolute isolation of the family is maintained, and also probably in most of the cities where wage-earners are kept from work. In Buffalo, Fall River, and Lawrence[1] the children of the tenement must be kept off the street while the card is up. This is not done in Cambridge, Chicago, New Haven, Paterson, and Rochester. The school attendance of such children is referred to on another page.

In most communities including such large cities as Chicago, Cincinnati, New Haven, New York, Paterson, Philadelphia, and Rochester, wage earners in families with scarlet fever and diphtheria are not kept from work. In some places, as Boston and other Massachusetts cities, and in Buffalo, Cleveland, Newark, Pittsburgh, Providence, St. Paul, and Toledo, they are not permitted to work unless the sick person is completely isolated from the workers, and it is not even then allowed if the workers are brought much in contact with children. In Providence in cases of diphtheria persons may not go to work unless a culture taken from the throat does not show the presence of diphtheria bacilli. In Baltimore a similar requirement is made by the proprietors of some of the mills. The following rules of the state board of health of Iowa state the requirements which must be fulfilled in cases of diphtheria before wage earners can go to work:[2]

[1] Lawrence, Rules of the Board of Health, 1 May, 1893, Sec. VI., Rule 5.

[2] Regulations for Quarantine of Communicable Disease, Iowa State Board of Health (1899), Rule 9.

"When a family is quarantined for Diphtheria, the head of the family, or bread-winner, may at the discretion of the local board, have the privilege of attending to his regular business, and of going to and from his house only when complying with the following conditions, and the Mayor or Township Clerk (as the case may be), shall issue a permit therefor:

"*First.*—He shall change his clothing before going to and leaving his home to go to his place of business.

"*Second.*—He shall wash his hands, face, head, and beard with a two per cent. solution of carbolic acid, each time before leaving his home to go to his place of business.

"*Third.*—While in the house he shall not act as nurse nor live in the same room with the sick person.

"*Fourth.*—He shall not attend any public meeting, nor attend any place where persons are congregated.

"*Fifth.*—This privilege shall not be granted to school teachers, nor to any person whose business brings him in intimate contact with children."

Explicit rules governing members of the family other than the sick are found in North Dakota.[1]

In Newark, Providence, Rochester, and Toledo, when workers are to be kept from their tasks, notice is sent to the employer. See Appendix 63. Other forms of notices and of permits to work are also shown in the Appendices 64–67.

In certain kinds of business the worker is obliged to remove from home. This in most communities is required of teachers, and, as in Iowa above, the privilege of remaining at home is denied all who come "in intimate contact with children." Letter-carriers, dry goods clerks,

[1] North Dakota, Regulations of State Board of Health:

"The health officer shall rigidly quarantine on the premises upon which the infected house is situated, all the other occupants of the house or building, not ill of the disease, until after: (*a*) The removal or thorough isolation of the patient; (*b*) Until after disinfection to the satisfaction of the health officer, of those not ill of the disease, their persons, clothing and that part of the house occupied by them. After all such precautions have been taken, such persons shall not engage in their usual avocations, or in any other way mix or come in contact with other individuals until the health officer shall have given a certificate that in his opinion they may do so without danger of spreading the disease.

"In case the disease be scarlet fever, the certificate releasing from quarantine shall not be given by the health officer, to the persons exposed, and who have not had the disease, until after the usual period of incubation has elapsed, since last exposure, viz.: a period of at least four days, or longer, at the discretion of the health officer. In the case the disease be diphtheria the quarantine period shall be at least four days, or until a bacteriological examination of the secretions of the pharnyx or naso-pharnyx has been made, and found free from the bacillus. Such examination to be at the discretion of the health officer. In case of smallpox, persons who have never had the disease, and who have not well marked vaccinal scars, must not be released until after a period of fourteen days after last exposure. All who have been exposed must be vaccinated, or re-vaccinated, at once, and those who have had smallpox, or who have on their persons well marked typical vaccination scars, may be released after thorough disinfection of persons and clothing, without further detention.

dressmakers, waiters, policemen, milkmen, handlers of food stuffs, etc., are among business people who are required to remove from the infected house. Sometimes these matters are left to the discretion of the officer and sometimes they are expressed in formal rules. See page 453.

Sometimes while the members of the family who are well are not kept in the house, they are forbidden to go in public places. Thus in Iowa[1] "no person residing in such household, family or place shall be permitted to attend any public meeting." In Providence:[2]

"No person living in a family where there is a person sick with smallpox, scarlet fever, diphtheria, membranous croup, or while the warning sign is upon the house, shall visit a theatre, church, a public library, or any public assemblage, without the permission of the Superintendent of Health."

The Iowa rule defining isolation and forbidding ingress and egress from the house is given below.[3] The regulations of many other cities are more explicitly forbid visiting the infected family or house.[4] In New Orleans the householder is required to prevent such visits.[5] In Lawrence "None other than the tenants occupying the tenement where the contagion exists, will be allowed to enter."

The visits of the physician are sometimes regulated as in Indiana.[6]

[1] *Iowa.* Regulations of State Board of Health (1899), Rule 4.

[2] *Providence.* Rules of the Board of Aldermen (1899), Chapter I, Sec. 4.

[3] *Iowa.* Regulations State Board of Health, in regard to Communicable Diseases (1899). Rule 7:

"Isolation means the complete exclusion of all other persons from the sick except the nurse and attending physician; that the nurse shall be restrained from going to and from the premises, or mingling with the family; that all well persons shall be prevented from contact with bedding, clothing, food, or other articles that have been used on or about the sick. Where from necessity the parents or family are nurses, the isolation and quarantine applies to them."

[4] *Albany.* Rules and Regulations of the Board of Health (1892), Sec. 24:

"No person or persons, excepting those in professional attendance upon the sick, shall knowingly visit any dwelling, building or place in which there is any person or thing infected with any malignant or contagious disease, or hold communication or intercourse with any person or thing (to his or their knowledge) exposed to such disease, without the special permit and by the direction of this board or its health officer."

[5] *New Orleans.* Ordinances, Council Series 2777, Sec. 2:

"That no householder, whether the owner of the premises, or any part thereof, a possessor or occupant thereof, by lease or otherwise, shall allow or permit contrary to the order of the board of health of the State of Louisiana, any person or persons to visit any person who may be sick or confined on said premises with any infectious or contagious disease, saving and excepting such person or persons as may be actually and absolutely necessary and essential to the proper care and attention of said sick person or persons."

[6] *Indiana.* State Board of Health Rules, 15 April, 1898, Rule 12:

"Every physician attending a case of smallpox, scarlet fever, diphtheria, membranous croup or other communicable disease dangerous to public health, shall use every reasonable precaution to prevent communicating the disease to others."

A similar rule has been adopted by the state board of health of North Dakota and Ohio except that the word possible is used instead of reasonable. In Utah[1] and Vermont[2] the physician and nurse must disinfect themselves and their clothing before leaving the house or premises.

The egress of the nurse is referred to in the Iowa rule and Maine statute before quoted and has received attention from the Vermont legislators. In Detroit[3] the method of disinfection is described as follows:

"Any person nursing or taking care of any person sick with either of said diseases shall, before going upon the streets or visiting any other house, take a warm bath, and disinfect the hair of the head, the hands, the finger nails, by means of the above mentioned spray, changing all underclothing and clothing which had been worn while in attendance on the patient, and see that the former underclothing and clothing are thoroughly disinfected by either sulphur, boiling in water, steam, or spraying with disinfectant cologne, and allowed to dry, and shall not attend any non-contagious disease without a permit from the health officer."

Several of the regulations require parents and others to protect from contagion the children in their care.[4]

Other Families in the House. It is rare that isolation is extended to families other than that in which the disease exists even if they live in the same house. It is true that many of the laws referred to above mention the house though the restrictions are only intended to apply to the infected family, but they are then so worded that their application to the whole house is left to the discretion of the health officer. Thus in the Rhode Island law referred to on page 448 no one may leave the house without a permit, but in almost all cases this permit can be obtained except for certain members of the infected family. Sometimes the children of other families may be subjected to restrictions, but rarely adults. Children from the whole house are generally excluded from school. The rule in regard to children in Fall River is given below.[5]

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[1] Utah, Revised Statutes (1898), Sec. 1112.

[2] Vermont, Rules of State Board of Health, 1 June, 1899.

[3] Detroit, Ordinance of 24 May, 1892, Sec. 8.

[4] Michigan, Chapter 15 of 1891, Sec. 1:

". . . No one shall in any way knowingly or willfully expose or cause to be exposed a minor child or other irresponsible person to danger of contracting any one of the aforesaid diseases."

Minneapolis, Ordinance of 25 July, 1897, Sec. 11:

No parent, guardian or custodian of any minor child within said city shall permit such child to be unnecessarily exposed to contagion or infection from any contagious or infectious disease."

[5] Fall River, Orders of the Board of Health, 4:

"*Ordered*, That no child, from any house where there is a case of scarlet fever or diphtheria shall be allowed to mingle with those from any other house, until

Persons Exposed. Except in smallpox, yellow fever, typhus and cholera, persons who have simply been exposed to the disease are rarely restrained. In the diseases above mentioned, persons exposed by being in the same house, yard, workshop, vessel, etc., are often detained a sufficient time to determine whether or not they have contracted the disease. This will be further considered in treating of the management of outbreaks. In the Ohio state board of health rules, the period of isolation for all persons exposed to the different communicable diseases is specified, but the rule does not definitely require their isolation. The periods are as follows:

OHIO STATE BOARD OF HEALTH RULES.

Diphtheria. For persons associated with, or in the house with the patient: Quarantine until after death or recovery of the patient and disinfection of the premises.

Scarlet Fever. Quarantine of children associated with or in the house with the patient for ten (10) days after complete desquamation or scaling of patient and disinfection of the premises.

Smallpox. For exposed persons: Quarantine for fourteen (14) days from date of last exposure.

Cholera and Yellow Fever. For exposed persons: Quarantine for five days from date of last exposure.

Typhus Fever. For exposed persons: Quarantine for twenty-one (21) days from date of last exposure.

Duration of Isolation. It is of the utmost importance that isolation should be maintained a sufficient length of time. If it is terminated too soon, great hardship is inflicted without accomplishing the intended result. It is not an easy matter in most communicable diseases to determine with accuracy the time at which the patient ceases to be infectious. Uncertainty in regard to this is well shown by the varying limits that are set for isolation in different places. In most cases the determination of the period of isolation is left to the local board of health or health officer, as in Rhode Island (see p. 448). A number of municipal ordinances also specifically refer the matter to the health officer.

In no state is the period of isolation for communicable disease fixed by statute, but it is by the rules of the state board of health (which have the force of law) in Iowa, Missouri, Ohio, and South Dakota. It is also fixed by ordinance or rule in the cities of Colorado Springs, Concord, Denver, Fall River, Framingham, Mass., Holyoke, Lowell, Milwaukee, Minneapolis, Montclair, N. J., New Bedford, Omaha, Provi-

after the recovery or death of the patient and the disinfection of the premises and the removal of the card, by a duly authorized agent of the board of health."

dence, Salt Lake City, Syracuse, Utica, and Yonkers, but in many cities it is left to the judgment of the health officer.

A number of cities leave the duration of isolation to the attending physician. This is true of Baltimore, Cincinnati, Milwaukee, Paterson, Pittsburgh (in scarlet fever), Charleston, Chicago, Cleveland, Portland, Me., Reading, St. Paul, and Wilmington.

This period of isolation, of course, varies in different diseases and the data collected are as follows. The period of isolation is for:

Smallpox.

Four weeks in Framingham, Mass.

Forty days in Colorado Springs, Iowa, and Missouri.

Six weeks in Concord, Montclair, N. J., and Newark.

Five days after desquamation in North Dakota.

Until desquamation is completed in Boston, Cincinnati, Ohio, Providence, and South Dakota.

Scarlet Fever.

After desquamation in New Haven and Seattle.

Five days after desquamation in North Dakota.

Ten days after desquamation in Ohio and South Dakota.

Three weeks in Buffalo,[1] Cambridge,[1] Grand Rapids, Holyoke,[1] Lowell,[1] Leominster, Mass.,[1] Minneapolis, Newark,[1] New York,[1] Syracuse, Utah, and Utica.

Four weeks in Brookline, Mass., Concord, Kansas City, Newton, Mass., and Omaha.[1]

Thirty days in Milwaukee,[2] Paterson,[2] and Pittsburgh.[2]

Thirty-five days in Colorado Springs and Iowa.

Five weeks in Providence[1] and Rochester.[1]

Six weeks in New Bedford, St. Paul, and Yonkers.[1]

Six weeks in Denver, Fall River, Framingham, Mass., and Montclair, N. J.

Of 102 replies made to an enquiry by the state board of health of Minnesota[3] of towns in that state, 4 stated that the period of isolation was 2 weeks, 17 reported it 3 weeks, 8 reported 4 weeks, 1 reported 5 weeks, 21 reported 6 weeks, 3 reported 8 weeks, and 11 determined the period of isolation by the duration of desquamation.[3]

Diphtheria.

Until the discovery of the pathogenicity of the Klebs-Loeffler bacillus and the development of the culture method of determining its pres-

[1] Isolation is continued longer if desquamation persists.

[2] Isolation is maintained for this time, unless the physician certifies that desquamation has ceased. It is never maintained longer even if desquamation continues.

[3] Minnesota, Report of State Board of Health (1895–8), p. 404.

ence, it was necessary to fix an arbitrary time limit for isolation in this disease. As the infectious period in this as in most of the communicable diseases varies in different cases, it was necessary in fixing a time limit to fix some arbitrary time which was supposed to suffice for the majority of cases. This was:

Two weeks in New Haven and Salt Lake City.

Ten days after disappearance of membrane in Chicago.

Fourteen days after recovery in Ohio, South Dakota, and Utah.

Three weeks in Concord, Grand Rapids, Montclair,[2] and North Dakota.

Four weeks in Brookline,[2] Fall River (or a negative culture), Framingham, Mass., Kansas City, Milwaukee, New Bedford, and Yonkers.[2]

Thirty days in Cleveland,[3] Paterson,[3] Pittsburgh,[1] and St. Paul.

Thirty-five days in Colorado Springs and Iowa.

An investigation by the Minnesota state board of health[4] showed that in 1898 121 cities and towns had a time limit for the isolation of diphtheria. In 8 it was for 2 weeks, in 14, 3 weeks; in 10, 4 weeks; in 9, 6 weeks; in 1, 7 weeks, in 12, 2 weeks, and in 13, 3 weeks after recovery. Twenty-eight health officers terminated isolation on securing a negative culture from the throat.

With the development of the culture method of determining the presence of the diphtheria bacillus it was believed that there was furnished a much more satisfactory method of deciding when a patient was free from infection. Nearly all health officials who are so situated as to have laboratory facilities now make the cessation of isolation depend upon the obtaining of a negative culture from the patient. As may be seen from the facts above given, the arbitrary period of isolation fixed upon previous to the advent of the culture method was about four weeks. By terminating isolation by the usual culture method, the average period of isolation is considerably shortened, the method thus resulting in a very considerable saving in time.

In most cities one negative culture from the throat of all persons sick is all that is required. In Boston, Brookline, Holyoke, Newton, Springfield, and Waltham, Mass., two successive negatives are necessary, and in New Bedford two if four weeks has not elapsed, but if it has, one will suffice. In Minnesota the state board of health has made it a rule that isolation shall continue four weeks unless two nega-

[1] Isolation never continues over thirty days even if diphtheria bacilli persist in the throat. The card is removed before thirty days if the bacilli disappear.

[2] Isolation is continued longer if diphtheria bacilli still remain in the throat.

[3] The time is shortened if the attending physician certifies that there is no danger.

[4] Minnesota, State Board of Health Report (1895–8), p. 403.

tive cultures are obtained.[1] In Boston, Newton, and Springfield the two negative cultures must be at least twenty-four hours apart, and the last one is taken by the health officer.

In Providence and St. Paul a negative culture is required from the throat of every member of the family, and it has been found that Klebs-Loeffler bacilli are found in the throats of from twelve to eighteen per cent. of the well.[2] In Denver the throats of all the children in the family are in most cases examined. This practice has met with much opposition in both cities.

Measles.

One week in Detroit.

Two weeks in Buffalo, Concord, New York,[3] Providence, and Yonkers.

Two weeks after eruption fades in Brookline and Fall River.

Two weeks after recovery in Boston.

Three weeks in Montclair, N. J., New Bedford, and Ottumwa, Ia.

Whooping Cough.

Six weeks in Montclair, N. J.

On recovery in Providence.

As long as the cough lasts in Boston.

The time limit that is thus set refers of course to those cases in which the patient recovers. If the patient dies the isolation may terminate sooner. In most places a private funeral is required and the warning sign is kept up till after the funeral, and then the premises must usually be disinfected before the placard is removed. Usually the isolation then ceases; sometimes, however, it is required that it be maintained awhile longer; thus in Iowa it must be maintained for seventeen days after death, in Salt Lake City, seven days.

While a time limit for isolation is thus fixed by formal rule in many states and cities, numbers of these rules have the proviso that isolation shall be for at least the specified time, and the health officer or the board of health has the authority to extend it. Again as the warning sign may not be removed without permission, the health officer has it in his power nearly always to extend the period of isolation if he deems necessary. This, however, is rarely done; more often the health officer exhibits laxness by terminating isolation before the authorized time.

Removal of Communicable Diseases. The removal of a case of communicable disease is such a serious matter that it is specifically forbidden in several states and a large number of cities. Of course, if the

[1] Minnesota, Regulations State Board of Health, 12 April, 1898.

[2] Providence, Reports of Superintendent of Health, 1897 to 1900.

[3] If desquamation has ceased.

[illegible] beginning, there would be [illegible] removal of the case [illegible] are rather intended for the [illegible] supervision. The pur- [illegible] prevent the removal of the [illegible] second or perhaps third [illegible] sanitary code of New [illegible] this and has been very [illegible] different rule in Cin- [illegible] is to the sick.[1] A similar [illegible] Of course, these rules [illegible] hospital, and this exception is [illegible] mania the physician is [illegible] longer to others during, [illegible] the disinfection of the [illegible] and Pennsylvania[2] [illegible] The Pennsylvania [illegible] is the owner of the [illegible] given below,

[illegible] suffering with [illegible] infected article of

[illegible] for disinfec-

[illegible] them, in which [illegible] immediately [illegible] again be

[illegible] without [illegible] any other, or [illegible] from any [illegible] that has [illegible] disease, nor

[illegible] this [illegible] any hired [illegible] who is so [illegible] driver [illegible] driver [illegible] conveyance [illegible] sufferer.

used until it has been disinfected to the satisfaction of said health officer, as certified by him."

In Maryland[1] the person who was conveyed must pay for the disinfection. In order that the health officer may know of the facts and see that disinfection is done, the District of Columbia rule provides

"That any person suffering from such disease and any person in charge of one so suffering having entered any public conveyance shall forthwith report in writing to said health officer the time of such use, the number and kind of conveyance used, and, if known, the name of the driver."

and there is a similar provision in Maryland. In Buffalo[2] the hospital superintendent must report to the health commissioner when a case of communicable disease is brought in a public conveyance. In Scranton it is required that a copy of the law be posted in each public carriage by the owner, the notice to be furnished by the board of health. In Haverhill all carriages carrying persons from a commmunicable disease funeral are within the meaning of "transporting communicable diseases." (See carriages for funerals, page 474.)

Infected Goods. As infection is sometimes carried in articles of various kinds, it is common to forbid the removal from a house where there is communicable disease of anything which may have become infected. Such regulations are found in most cities and in a few state laws.[3]

Some of the regulations forbid the removal of articles without a permit from the health authorities, and sometimes it is made an offence to carry infected articles in a public conveyance.[4]

As nothing is more likely to infect clothing than the making of it by persons with communicable disease or persons who have the care of such cases, the making of clothing in infected houses is forbidden in Buffalo, Fitchburg, New York City, Providence, and probably other cities.[5] In Providence the restriction applies only to the family where

[1] Maryland, Chapter 155 of 1882, Sec. 6.

[2] Buffalo, Ordinances (1892), Chapter 25, Sec. 151.

[3] Pennsylvania, Chapter 124 of 1895, Sec. 17:

"No person shall without previous disinfection give, lend, sell, transmit, or expose any bedding, clothing, rags, or other articles which have been exposed to infection: *Provided*, That such restriction shall not apply to the transmission of articles with proper precautions for the purpose of having the same disinfected."

[4] Bridgeport, Ordinances (1892), Chapter 14, Sec. 7:

"No one shall enter a passenger car, street car, steamboat, hack, cab, stage or other public conveyance, wearing or having in his or her possession any clothing or articles with which he or she shall have been in attendance upon a person sick with diphtheria, smallpox, scarlet fever, or typhus fever, without having had the same disinfected to the satisfaction of the board of health."

[5] Buffalo, Ordinances (1892), Chapter 25, Sec. 24:

"No person shall make, procure or cause to be made, any clothing or wearing apparel of any kind, in any house or building wherein any person shall be sick with

the communicable disease exists. A number of the tenement house laws also forbid the making of clothing or carrying on of other trades in tenements where there is communicable disease.

Milk business when carried on from a house with communicable disease is dangerous, as the infection may be carried by members of the family and may also get into the milk. Regulations concerning the sale of milk when communicable disease invades the family of the producer or dealer have been referred to on page 419. It is almost always forbidden to sell milk in such cases unless the milk and those who handle it are removed from the infected house.

When the milkman leaves bottles or cans with the infected family and removes those left the day before, there is danger that the latter may be infected, and that by this means the milkman may carry the disease to others. It is for this reason that the use of bottles has been forbidden in Los Angeles. In other cities it is only forbidden when there is communicable disease in the house.

Sometimes tickets are used by dealers in payment for milk, bread, etc., and it is provided in Richmond, Ind.,[1] Meadville, Pa., and Little Rock, N. Y., that such shall be collected from infected houses and burned. See also page 420.

It has been supposed that pet animals as dogs and cats are very likely to carry infection, and the following rule is found in Meadville, Pa.:

"No dogs, cats or other household pets, shall be permitted to remain in any house in which there may be a contagious disease; if any such animal has been exposed to the contagion it must be disinfected when removed, and not returned until after the house shall have been fumigated.[2]

In Missouri the rules of the state board of health require that all pet animals exposed to smallpox shall be killed and burned.

Public Libraries and Communicable Disease. Books if handled by persons with a communicable disease are particularly liable to be infected, and if they are infected it is very difficult to disinfect them. It is therefore wise to guard against the infection of public libraries which would from their free circulation be especially likely to spread disease. A great many cities, and some states, as Indiana, Ohio, and Vermont, now have regulations in regard to this and seek to prevent the infection of such books. Sometimes the infected family is forbidden to take

smallpox, varioloid, or other infectious or pestilential disease, except for the personal use of some of the inmates of said house, and no person shall sell or expose for sale any clothing or wearing apparel which shall have been made in any house or building in which there shall have been at the time when said clothing was made, any person sick or infected with any such disease."

[1] Richmond, Ind., Report of Board of Health 1896, p. 5.

[2] Meadville, Rules and Regulations (1895), Rule 30.

books from the library as in Cambridge, Fitchburg,[1] and Lynn. "Circulating library" is included in the rule as in Cambridge. In other cases, as in Indiana and Vermont,[2] the librarian is not to send out books. In order that the librarian may be enabled to carry out this law the Vermont rule provides that the health officer shall immediately send notice to the librarian of the name and address of every case of communicable disease. Similar rules are found in many cities and in others where there is no such rule notice is regularly sent by the health department. In Providence notices are sent to private circulating libraries as well. In Providence a separate card is sent for each case giving the name, residence, disease and date. These are kept in alphabetical arrangement by the librarian and no books are issued to the infected houses and all that have been issued are by him returned to the health department for disinfection.

After the case has recovered notice is sent to the librarian in Cincinnati, Fitchburg, Lynn, Providence, and some other cities.

School Attendance. It is extremely important that children infected with communicable disease should be kept out of school. The very great danger to which large numbers of children would be exposed is reason enough for this; and the public school system is held in such high esteem, and such strenuous efforts are made to prevent everything which would interfere with its success that it is much easier to enforce exclusion from school than it is any other form of isolation. It is a well nigh universal rule to exclude from school children infected with communicable disease. State regulations to this effect are found in many states,[3] and in almost every city or township which has any sanitary regulations at all.

Boards of health usually have under the legislative power granted them, authority to make rules in regard to school attendance, but in New Jersey this authority is reserved to the board of education.[4] In Massachusetts and South Carolina also the school board has this power.

[1] Fitchburg, Regulations of Board of Health, 25 August, 1894, Rule 11:

"No person from a family wherein a case of Asiatic cholera, yellow fever, smallpox, varioloid, diphtheria, membraneous croup, or scarlet fever exists, shall take any book to or from the public library."

[2] Vermont, Regulations of State Board of Health, Art. 1.

"Librarians receiving such notice shall not allow any books or periodicals to be taken by such family after such notice, and they shall not allow any books then held by any member of a family where there is contagious disease to be returned to their libraries until disinfected under the direction of the health officer.[1]

[3] Colorado, Delaware, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, North Carolina, Ohio, Oklahoma, Pennsylvania, South Dakota, South Carolina, Tennessee, Utah, Vermont, Virginia, and Wisconsin.

[4] New Jersey, General Statutes (1895), p. 1639, Sec. 22:

"That any board of education, school trustees or other body having control of the public schools may, on account of the prevalence of any contagious disease, or

[illegible] the items found in these school regula-[illegible]

[illegible] A good many of the laws simply exclude infected [illegible] many exclude "persons" and some men-[illegible] "parents" and in Fall River "janitors" are named [illegible] "No person shall attend or visit" a school [illegible] with a communicable disease.

[illegible] sick with a communicable disease are invari-[illegible] but a number of diseases are at times thus [illegible] from and which receive no other [illegible] times. This measles and whooping cough [illegible] invariably are excluded from [illegible] measles are rarely reported but they are [illegible] Iowa state board of health. Ring-worm [illegible] excluded in Boston, Providence, [illegible] following purulent ophthalmia is not [illegible] and in Bridgeport the same is true of [illegible]

[illegible] lawyers to raise the quibbling [illegible] who is yet desquamating [illegible] who has diphtheria bacilli in the throat is not "sick" [illegible] or "affected with" a communicable disease, the [illegible] state board of health rule excludes any one who "has recently been affected" with the specified disease. A similar provision is found in Minnesota,[1] Ohio, Rochester, and in Maine[2] "persons recovering from communicable disease must have a permit before leaving the house."

Not only is the sick person excluded but also the other members of the family. This is required by rule in smallpox, diphtheria, scarlet fever, and the rarer severe diseases in many states[3] and cities, and even where there is no law on the subject it is almost universally the practice. In New York City in tenement houses the rule is extended to all the families on the floor.

The rules in other states and cities require the exclusion from school

[illegible] prevent the spread of such contagious disease, prohibit the attendance of any teacher or scholar upon any school under their control, and may specify the time during which such teacher or scholar shall remain away from such school."

[1] Indiana, State Board of Health Rules, 19 February, 1891.

Minnesota, Statutes (1894), Sec. 7045.

[2] Maine, Chapter 123 of 1887 as amended by Chapter 139 of 1895, Sec. 15.

[3] Delaware, Iowa, Kentucky, Massachusetts, North Carolina, Vermont, Atlanta, Baltimore, Brookline, Mass., Concord, Fitchburg, Framingham, Mass., Lowell, Macon, Newton, Mass., New York City, Philadelphia, Spokane, St. Louis, and Syracuse.

of all children living in the house.[1] An inquiry sent out by the Minnesota state board of health[2] showed that there was only one local board of health in that state which did not exclude from school all children in the infected houses. In Fitchburg a house is defined as follows:

> "In excluding pupils from any house in which smallpox, scarlet fever, diphtheria, and membranous croup exists, two or more buildings must be considered as one house if there is any direct communication between them; or if it is possible to enter or leave the two residences by means of the same hall, stairway, or door."[3]

As most of these rules exclude the person unless or until a permit is given by the health authorities, it is impossible to determine from the rules alone how strictly the exclusion is extended to the whole family or house. It is believed, however, that the permit under the above-mentioned rules is rarely given to any children living in the house and almost never in the case of members of the family. In Providence all children living in the infected house are excluded whenever it appears to the inspector that the families cannot be trusted to keep isolated from one another. This is in about twenty-five per cent. of the cases. In other cases persons living in the house but not in the family are allowed to go to school, in scarlet fever after one week, and in diphtheria after a negative culture has been obtained from the throat. Out of 210 families where such permits were given in only one did the disease subsequently appear, which would indicate that the isolation which the department relied upon was well maintained. Children living in the house would be more likely to contract the disease than to carry it to others, and of 540 susceptible children in these houses only one became sick. This would indicate that when there was reasonably good isolation children in other families in the house may with a fair degree of safety attend school. Cambridge also follows the Providence plan. In Brookline, Mass., children from a family where there is whooping cough may attend school only when they have previously had the disease.

Of course, when the rules are so stringent, parents who have sickness in their families or house and who wish to send their well children to school, send their children away to board. In such cases in Providence a written permit is given, but only after the lapse of a week in scarlet fever, if the child has not had the disease. If the child has had it, the permit is given at once. In diphtheria a negative culture is required, and then the permit is given at once. See Appendix

[1] Indiana, Minnesota, Ohio, Pennsylvania, South Dakota, Tennessee, and in Bridgeport, Camden, Denver, Fall River, Hartford, Jersey City, Louisville, Newark, New Haven, New Orleans, Providence, Rochester, Salt Lake City, Worcester, and Yonkers.

[2] Minnesota, State Board of Health Report (1895–8), p. 405.

[3] Fitchburg, Rules of Board of Health (1897), Rule 18.

68. This permit is of a different color from that used after the card is removed. In Denver as in Providence the period of exclusion is one week after removal from scarlet fever. In Philadelphia it is two weeks. In Providence those exposed to diphtheria may attend school after a single negative culture from the throat, but in Denver a week must elapse and a negative culture be secured. In the City of New York children in institutions are kept out of school for ten days after exposure.

In many cities persons exposed must not be admitted to school. In Concord such child is to be excluded until a certificate has been granted by the board of health that the period of incubation belonging to the disease to which he has been exposed is passed. Brookline, Mass., Cambridge, Fall River, Fitchburg, Minneapolis, New Haven, Paterson, and Somerville do not allow children in school for two weeks if they have visited a house where there is communicable disease.[1] In Fitchburg and other cities it is also directed that pupils are not to be sent to the house when communicable diseases are believed to exist in the household of absent pupils. A similar provision in the Iowa rules applies to teachers.

Responsibility for Exclusion. A considerable number of the regulations place the responsibility for exclusion upon the teacher, who is not to permit the child to attend school. This is by far the easiest way to enforce the law, for the teachers are public officials and are therefore more easily controlled, provided, of course, the school authorities are in sympathy with the sanitary officials. Other rules place the responsibility upon the parent who is not to send the child to school. Others still make both parties responsible. The ordinance from Rochester is perhaps as explicit as any one rule.[2]

[1] Fitchburg, Rules and Regulations of Board of Health (1897), Rule 16:

"The principal of any school upon the receipt of information satisfactory to him that any pupil attending school under his charge has visited a household where, at the time of such visit, smallpox, diphtheria, membranous croup, or scarlet fever existed, is authorized to suspend such pupil from school for a period of two weeks next following such visit."

[2] Rochester, Ordinances of the Board of Health (1895), No. 11, Sec. 1:

"No principal, superintendent, teacher or person acting for or representing any such principal, superintendent or teacher of any school, and no parent, master, guardian, or custodian of any minor child shall permit any such child, having scarlet fever, diphtheria, membranous croup, smallpox, measles, whooping cough, or any other dangerous, infectious disease, or any child residing in any house in which any such disease exists or has recently existed, to attend any public or private school, until he or she shall have obtained from this board permission to attend such school. Nor shall any such principal, superintendent, teacher or person acting for or representing any such principal, superintendent or teacher, permit any such child to be unnecessarily exposed or to heedlessly expose any other person to the taking or to the infection of any contagious disease."

In New Orleans parents must notify teachers of communicable diseases. Atlanta has a unique provision that physicians must notify the superintendent of schools, but in most cities this is left to the health officer. Sometimes, as in New Orleans,[1] Oklahoma,[2] and St. Louis,[3] teachers are explicitly directed to send out all cases of communicable diseases found in the school.

In Worcester,[4] and doubtless in many other cities, teachers are requested to send away from school any children suspected of having communicable disease, and in Worcester cases of sore throat are to be excluded.

Schools included in the Rules. Many of the regulations forbid attendance at any school. A few simply apply to public schools. Private schools are named in the regulations in Indiana, Ohio, and in Buffalo, Lowell, the City of New York, and Providence; parochial schools in Indiana, Ohio, and Providence; Sunday schools in Buffalo, Cincinnati, the District of Columbia, Philadelphia, and Providence; night schools in Minneapolis; colleges in Cincinnati and the District of Columbia; seminaries in the District of Columbia; and "any educational institution" in Providence.

Duration of Exclusion. Of course children and other persons are not allowed to return to school before the termination of the isolation at home as shown on page 457, that is before the house is disinfected and the warning sign removed. Exclusion will be at least as long as isolation at home and sometimes longer. Some of the regulations as those of Illinois, Buffalo, Concord, Denver, Louisville, New Haven, Paterson, Rochester, and Yonkers prescribe definitely the time during which the exclusion must continue. In the cities above mentioned, the period of exclusion from school is somewhat longer than the isolation at

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[1] New Orleans, Ordinance, Council Series No. 2777, Sec. 6:

"That every principal, teacher or assistant teacher of any and every private or public school, on observing that any child or children, pupils of said school, present symptoms of any contagious, infectious or pestilential disease, shall send said child or pupil to said pupil's or child's domicile and residence, with instructions to the parent or parents, tutor, guardian or other person in charge of said pupil, child or children, to have the said pupil or child, or pupils or children examined by the family physician, and said instructions shall be in writing, and in no case shall said child or children, pupil or pupils, so sent home, be allowed to attend said school thereafter until there shall be produced and filed with said principal, teacher or assistant teacher, a certificate from a licensed physician that said child or children, pupil or pupils, are not suffering from any contagious, infectious or pestilential diseases."

[2] Oklahoma, Rules of Territorial Board of Health, Sec. 4.

[3] St. Louis, Ordinances (1892), Chapter 14, Sec. 382.

[4] Worcester, Report of Board of Health (1895).

home, usually about two weeks, though in Buffalo it is three weeks and in Louisville twenty days. The laws of Iowa, Massachusetts, North Carolina, and Tennessee require exclusion for two weeks after recovery, (three days after measles in Massachusetts); those of Pennsylvania, thirty days after recovery. In Utah exclusion is maintained three weeks after the card is off in scarlet fever, and two weeks after in diphtheria.

Regulations which allow a permit a certain time after "recovery" are not definite, as it is impossible to determine exactly when recovery takes place, and practically leave the matter to be decided by the person who gives the permit to return. A number of cities among which are Paterson, Providence, and St. Paul, allow children to return to school as soon as the warning card is removed from the house.

Return Permits. Most regulations provide that persons may not enter school after communicable disease without a permit. There is, however, some difference of practice in regard to who shall issue the permit. In some places the permit is to be issued by the health department, in others by the attending physician, and in some by both.

The health department is to issue the permit in Minnesota, Pennsylvania, South Dakota, Albany, Asbury Park, Baltimore, Bridgeport, Cambridge, Camden, Concord, Denver, Elmira, Macon, Newburgh, New Haven, New York City, Paterson, Providence, San Francisco, and in St. Louis, in smallpox, scarlet fever, and diphtheria.

The form of permit used in Minneapolis is shown in Appendix 69. It has a stub for record. Providence has a simpler form and the date of granting the permit instead of being noted on a stub, is stamped on the slip on which a record of the case is kept. See Appendix 70.

In North Carolina, Ohio, Augusta, Charleston, Newark, New Orleans, Boston, and in St. Louis (in whooping cough, measles, and chicken pox), a certificate from the attending physician suffices. In Cleveland, Cincinnati, Fall River, Fitchburg, Jersey City, Newton, Mass., Buffalo, and Rochester, certificates from both physician and health department are required. The form used in Rochester is shown in Appendix 71.

In Chicago a postal card is sent by the health department to the principal of the school giving notice that the children may return to school. This is printed in red, while the exclusion notices are in black. In Milwaukee a certificate is issued by the health department which may be shown at the school or library or elsewhere.

In Delaware the law requires the school officers to issue the permit to return to school; in Iowa the mayor or town clerk; and in Massachusetts, North Carolina, Vermont, Louisville, and Spokane, it may be either the board of health or the attending physician.

In order that children may understand the rules in regard to communicable diseases it is required in Scranton that the rules be posted in the schoolroom.[1] In Montclair, N. J., a card stating the period of exclusion is given to the family in each case.

In Michigan,[2] teachers are required to teach the methods of preventing the spread of communicable diseases. Circulars have been issued by the state board of health to guide the teachers in their instruction, and since 1898 a teachers' monthly bulletin has been sent to all the teachers in the state. A number of the boards of health in other states where it is not required by law, nevertheless send monthly bulletins to teachers. It is to be feared that some of these bulletins need more careful editing.

Closure of Schools. The question of closing schools to prevent the spread of communicable disease has caused a great deal of discussion. If all the cases of communicable disease could be reported and isolated, there would of course, be no need of closing schools; but unfortunately this is not done, and sometimes one or more cases continue in school unrecognized perhaps by any one. The chance of this is very much diminished by careful medical supervision; but sometimes cases will elude even the most careful inspection, and in such cases when it is apparent that there is an unrecognized case attending the school and infecting the other pupils, the only thing to do is to close the school.

Several states, among which may be named New Jersey, Kentucky, Ohio, and South Carolina, provide by statute for the closing of schools to prevent the spread of communicable disease. In Ohio[3] the board of health may, "during an epidemic or threatened epidemic close any school." In New Jersey[4] the law does not give control of public schools to the board of health, but to the board of education.

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[1] Scranton, Rules and Regulations of Board of Health (1893), Sec. 44:

". . . And it shall be the duty of the board to have this section printed on cards mentioning the names of diseases declared communicable and dangerous to the public health in this rule, and posted in every schoolroom in this city; and it shall be the duty of each teacher to read the section to the school at least once a month and whenever any epidemic shall appear. And it shall be the duty of the board of health to have this section printed on cards and furnished to every private school, academy, seminary, kindergarten and Sunday school in this city, and to request the person or persons in charge of such private institutions to post such cards in conspicuous places, and read this section to the school at least once a month, and whenever any epidemic shall prevail."

[2] Michigan, Chapter 146 of 1895.

[3] Ohio, Annotated Statutes (1900), Sec. 2135.

[4] New Jersey, General Statutes (1895), p. 1639, Sec. 21:

"That the board of health of any township, or any city, borough, town or other local municipal government in this State shall have the right to declare any epidemic or cause of ill health to be so injurious or hazardous as to make it necessary

In South Carolina[1] the order of a board of health to close schools, must be approved by the city or town council. The closing of schools for communicable disease is, however, usually done by the board of health under its general grant of authority. Often, too, it is done by the school officers simply at the request of the sanitary officers, and sometimes it is done by the school authorities of their own volition. When a medical inspection of schools is maintained, it is said that closure is not so often necessary.

Disposal of Bodies of Persons Dead of Communicable Diseases. Doubless the danger to be apprehended from such bodies has been much exaggerated. If it were not for the reprehensible practice of kissing the corpse, which strange to say, is not uncommon, the danger from the body itself would be very slight. If this could be prevented, the danger would be from exposure to the members of the family and infected articles in the house; but there is a popular fear of danger from this source, and very stringent regulations regarding the methods of disposing of such dead bodies and of conducting funerals are commonly found. Such regulations are found in the statutes of Colorado, Connecticut, Maine, Minnesota, Missouri, New Mexico, Pennsylvania, Vermont, and the state board of health rules of Iowa, Indiana, North Carolina, North Dakota, Ohio, and South Dakota, and in the local rules of nearly all cities.

Report by Undertaker. A good many cities require that undertakers shall immediately report all deaths from communicable diseases. In Rochester the undertaker is to give immediate notice only when there is no physician in attendance. For some reason unknown to the writer, the board of health in Lowell refuses to receive such notice over the telephone.

Disinfection of the Body. In nearly all city and state rules the undertaker is required to disinfect the body. In Pennsylvania[2] it is simply stated that "it shall be the duty of the undertaker or other person or persons having the body in charge to thoroughly disinfect the body." In Connecticut it must be disinfected as required by the state board of health.[3] In most of the rules it is ordered that the body be

to close any or all of the public or private schools in the limits of such township, or of such city, borough, town or other local municipal government; but in case of public schools, the same shall not be closed except by the direction of the board of education, school trustees, or other body having the control or direction thereof; any such board of education, school trustees, or other body having control of public schools may in such case cause any or all of the schools under their control to be closed, if in their judgment, such closing be necessary for sanitary purposes.

[1] South Carolina, Act of 5 January, 1895.

[2] Pennsylvania, Chapter 124 of 1895, Sec. 4.

[3] Connecticut, Chapter 160 of 1893, Sec. 1.

wrapped in a sheet wet with a prescribed disinfecting solution. In Connecticut[1] the rule reads:

"That the body of any person who died of one of the diseases mentioned in the amendment to section 104, of the General Statutes, shall be prepared for burial by the person having it in charge, by wrapping it in several thicknesses of cloth, wrung out of solution made by dissolving *sixty grains of Corrosive Sublimate and two tablespoonfuls of Common Salt in one gallon of hot water, or, out of a solution made by dissolving six ounces of pure Carbolic Acid (not the commercial, colored, impure Acid), in a gallon of hot water.*"

In Lynn, Holyoke, Cambridge (see page 472) and Somerville, it is prescribed that the whole body including the face be so wrapped.

Various disinfectants are ordered as: Bichloride of mercury, 1 to 50 in Vermont; 1 to 100 in Denver; 1 to 125 in South Dakota, Youngstown, and Detroit; 1 to 150 in Colorado Springs; 1 to 200 in Portland Ore.; 1 to 500 in North Dakota, Boston, Buffalo, and Cambridge; 1 to 1,000 in Connecticut and Philadelphia. Carbolic acid 5 per cent. in Connecticut, District of Columbia, and Philadelphia. Chloride of zinc 10 per cent. in Holyoke and Lynn. Chloride of lime, 4 per cent. in Philadelphia. Sulphate of zinc, one-half pound to one gallon in Vermont. More explicit rules still in regard to disinfection are found in a few cities as Chicago, Detroit,[2] and Denver.[3] In Chicago:

"Before the body is moved or hauled for further treatment, the orifices of the nose and throat, and in typhoid fever the rectum should be packed with absorbent cotton saturated with an approved disinfectant, or thoroughly cleansed by an injection of such disinfectant; after which it may be bathed, dressed and encoffined, either wrapped in a disinfectant sheet or packed in absorbent cotton saturated with the disinfectant. If the face is left exposed, it should be freely sprayed with the disinfectant."

In Denver the body must be embalmed and the cavities stopped and filled with cotton soaked in corrosive sublimate 1 to 100.

Disinfection of the Room and the Undertaker. It is not usually required that the room shall be disinfected before the funeral, but in Chicago:

"The entire apartment and its belongings are to be thoroughly sprayed with an approved disinfectant, also before removal from the death room the exterior of the coffin should be sprayed or sponged with the disinfectant. It may then be removed to a room previously prepared by thorough ventilation, or, if necessary, by disinfection — and from which all unnecessary furniture and other articles have been removed. As soon as the body is removed from the death chamber, the room should be locked and no one allowed to enter, except the disinfectors, until the room and its belongings have been properly treated and made safe."

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[1] Connecticut, State Board of Health Rule, 6 July, 1893.

[2] Detroit, Ordinance of 24 May, 1892, Sec. 8.

[3] Denver, Ordinance 44 of 1893, Sec. 25.

The strictest rules for the undertaker's care of himself are in Detroit:[1]

". . . Every undertaker having in charge the body of any person who has died of either of the above mentioned diseases shall, during the time he is preparing such body for burial, wear a long rubber overcoat buttoned to the chin, and after he has properly prepared the body, shall spray his hair, beard, hands and boots, especially the soles, with the above disinfectant cologne, and shall wear his rubber coat when carrying or arranging said coffin or casket during the funeral. After said funeral the undertaker shall spray his hair, beard, hands, shoes or boots and rubber coat with said disinfecting cologne before returning home or walking the public streets."

The Coffin. Almost all the rules require that the body shall be at once placed in a coffin and the coffin closed and not again opened. In the majority of rules the coffin is to be "air-tight," in others it is to be simply "tight," in others "sealed," in Boston and Buffalo, "absolutely tight," in Minnesota "tightly sealed," in Pennsylvania "tightly closed." It is not generally intended by these rules that the coffin shall be "hermetically sealed," though this is required in Erie, but simply securely fastened so that it may not be easily opened. In the City of New York the casket is to be "properly sealed immediately and permanently." In the District of Columbia the coffin is to be "clamped." In Chicago:

"The coffin used in such cases should be absolutely water and air-tight so as to prevent leakage of poisonous or offensive fluids or gases during the conduct of the burial. All disinfectants used in such cases should be proven bacterially and chemically proficient."

In Philadelphia:[2]

". . . the entire inner surface of which (lid and all) shall be thoroughly and completely lined with a layer of raw cotton of a thickness of not less than one inch; and said coffin or casket shall be tightly closed with screws or clamps, *and remain so closed*, or the body, wrapped as above, shall be encased in a coffin or casket of metal, with all joints and seams closely soldered."

The Cambridge and Somerville rule requires the casket to be sealed with wax,[3] and in Portland, Ore.,[4] it must be made air tight with putty.

[1] Detroit, Ordinance of 24 May, 1892, Sec. 8.

[2] Philadelphia, Rules of the Board of Health (1895), Sec. 205.

[3] Cambridge, Rules of Board of Health (1897), Sec. 7:

"In all cases of death from diphtheria, membranous croup, scarlet fever, typhoid fever, typhus fever, smallpox or cholera, the undertaker shall wrap the entire body, including face, in a sheet saturated with a solution of one-fifth of one per cent. of bichloride of mercury, and then place it in a tight coffin or casket, and seal the lid in two places with sealing wax, and shall furnish the board with his sworn statement that the foregoing requirements have been complied with."

[4] Portland, Ore., Ordinance 10359, Sec. 14:

". . . the undertaker shall . . . immediately place the said body in a coffin and seal the same as follows: All joints shall be closed with putty, and the same material shall be used around the top and bottom of said coffin, making the same air tight."

Most of the rules require the body to be put in the casket "immediately," "at once" or "as soon as possible." In Cleveland however, six hours' time is given, and in Pennsylvania and Louisville six hours if the undertaker is summoned between five A. M., and eleven P. M., otherwise twelve hours. In Youngstown, O., it is five hours, in Cambridge eight hours, and in Erie twelve hours.

In Buffalo,[1] District of Columbia, and Philadelphia, the body must not be placed in an ice box.

Time of Burial. It is generally conceded that the sooner the body of a person dead of communicable disease is disposed of, the better it is. Many rules specify the time within which the burial or the funeral must take place. Often it is provided that the health officer may by express permit extend the time. The Iowa rule requires that the body shall be buried immediately, in Florida within six hours. In Indiana and South Dakota the time allowed is twelve hours; in Minnesota, Ohio, Albany, Asbury Park, Bridgeport, Buffalo, Fall River, Fitchburg, Haverhill, Lawrence, Newark, San Francisco, Spokane, and New Orleans (in the summer), twenty-four hours; in Wilmington, thirty hours, and in the District of Columbia, Elmira, Louisville, Pennsylvania, Rochester and New Orleans (in the winter), thirty-six hours. In New Bedford the body must be buried the same day or the next day.

Privacy of Funeral. Almost all cities require that the funerals of persons who have died of communicable disease shall be "private." Other terms are also used, as it shall be "strictly private," "there shall not be a public funeral" or a "church" funeral, and in Indiana and Iowa no "school funeral." It is also required that the attendance at the funeral shall be limited to "as few as possible," or that no one shall be present "whose attendance is unnecessary, or to whom there is danger of contagion thereby."

The interpretation of such general expressions is of course doubtful and must be left to the health officer, and in the last resort to the courts. In Albany the ordinance requires the health officer to fix the limit of attendance; but in many of the rules it has been deemed best to define more clearly what is meant by a private funeral and who may attend it. In Pennsylvania[2] the attendance is limited "to the immediate adult relatives of the deceased, and the necessary number of adult pall bearers." There may be "no child pall bearers or carriers." In Iowa,[3] and in Milwaukee[4] there can be "no pall bearer under twenty

[1] Buffalo, Ordinances (1893), Chapter 25, Sec. 57.

[2] Pennsylvania, Chapter 124 of 1895, Sec. 6.

[3] Iowa, Regulations of State Board of Health (1899), Sec. 27.

[4] Milwaukee, Report of Health Commissioner for year ending April, 1891, p. 21.

years of age," and only adults in Providence. In Cleveland[1] and Youngstown no children may attend the funeral. In Holyoke, Lowell, and Lynn the attendance is limited to the "immediate adult relatives," in Lawrence to the "adult family in the house," in Youngstown, O., to the adult members of the family. Only the "near relatives" and other adult persons not exceeding six in number as may be provided by rules of the director of police are allowed to be present in Cleveland.[2] In Newark the "immediate household," in San Francisco and Somerville the "immediate family," and in Providence the "immediate relatives" only are permitted to be present." In Minneapolis and Fitchburg the "immediate family" is still further limited to those "who are resident at the place of death." In Milwaukee only persons who have been already exposed may be present. It is, of course, necessary, if there is any funeral at all, that both undertaker and clergyman shall be present, but their presence is expressly permitted in only a few of the rules, as those in Indiana, Lynn, Milwaukee, Minneapolis, and Providence. In San Francisco the health officer may be present, and in Somerville "those whose business calls them there," which is doubtless intended to include the undertaker and clergyman. In Milwaukee "the clergymen must take all precautions they can command to prevent spreading the contagion." As nearly all the rules allow the health officer to grant permits for other persons, he can readily cause the presence of the clergyman to conform to the law. Most of these rules refer to funerals, but there may be other gatherings at the house and there may be individual visitors. Hence in Providence and Utica the persons in charge of the body shall not permit "any assemblage or gathering." In Haverhill "no person shall be allowed to enter the premises where the body is or view the body." In Vermont[3] the funeral must be conducted with as little publicity as possible.

Carriages at Funerals.

In Pennsylvania:[4]

"No undertaker, or other person or persons having charge of the funeral or burial of the body of a person who has died of any of the diseases mentioned in section four of this act, shall in any case furnish, or provide for such funeral, more than the necessary number of conveyances for said adult relatives and pall-bearers, and all such conveyances which may have been used or occupied by any person or persons who have been residing in the same family, or house, with the deceased, shall be fumigated and disinfected at such time and in such manner as may be directed and required by the health authorities."

[1] Cleveland, Ordinances, Chapter 30, Sec. 471.

[2] Cleveland, Ordinances, Chapter 30, Sec. 465.

[3] Vermont, Statutes (1894), Sec. 4687.

[4] Pennsylvania, Chapter 124 of 1895, Sec, 8.

In Detroit,[1]

"No public or private hack, carriage or conveyance used or held for hire shall be hired or used to attend funerals of persons dying of any of the above mentioned diseases without a permit for such use of said carriage first obtained from the health officer."

In Erie only three carriages are allowed, and in Yonkers only two. In Milwaukee[2] "no person shall be allowed to occupy the same carriage with those who are residing in the infected house." The kind of carriage that may be used is prescribed in Yonkers.[3]

As in Pennsylvania and Yonkers so in a number of other cities it is required that carriages used at funerals must be disinfected.

Place of Funeral. Many of the states forbid a church funeral and some few a school funeral.[4]

In Milwaukee and San Francisco it is forbidden to have any funeral at the house (services at the grave probably being permitted). In Providence also services at the grave alone are permitted in smallpox and in cases of scarlet fever and diphtheria that die at the hospital.

Funeral Notice. It is important that the funeral notice should be so worded as to warn persons not to come, instead of inviting them.[5] In

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[1] Detroit, Ordinance of 24 May, 1892.

[2] Milwaukee, Report of Commissioner of Health, ending April, 1891, p. 21.

[3] Yonkers, Sanitary Code (1897), Sec. 38:

"It shall be unlawful to permit more than two carriages at any such funeral. The carriage or carriages used to convey any person or persons from any infected house to the cemetery or elsewhere shall be upholstered in leather, including all parts of the inside of said carriage, except the floor and other parts composed of solid wood. The undertaker or other person or persons furnishing carriages to persons residing in or entering infected houses shall immediately fumigate or cause to be fumigated, and then washed with a disinfecting solution, every such carriage before using it for other purposes under the direct supervision of an employe of the board of health; and hereafter only such carriages shall be used to convey persons suffering from contagious diseases to the Yonkers city hospital. Any violation of this section will subject the offender to one hundred dollars fine and imprisonment."

[4] Iowa, State Board of Health Regulations (1899), Rule 27:

"No person, company, corporation, or association having charge of or control of any schoolhouse or church, or of any building, room or place used for school or church purposes, or for any public assembly, shall permit the body of any person dead from any of the contagious or infectious diseases named in these regulations, or any other dangerous contagious disease, except typhoid fever, to be taken into such schoolhouse, church, building, room or place, for the purpose of holding funeral service over such body."

[5] Buffalo Ordinances (1893), Chapter 25, Sec. 39:

"Whenever any person shall die from any of the contagious or infectious diseases named in section 11, the undertaker having charge of the preparation and interment of the remains shall be the only person authorized to insert the public

regard to funerals and burials refer to persons dead of "contagious or infectious diseases." Others either with or without retaining such general terms refer to special diseases, usually smallpox, scarlet fever, diphtheria, croup, and perhaps cholera, typhus, and yellow fever. Measles are added in Charleston, Lowell, Minneapolis, Newburgh, New York City, Rochester, Providence, Scranton, cerebro-spinal-meningitis in Philadelphia and Yonkers, and whooping cough in Minnesota. Public funerals in tuberculosis also are forbidden in Minneapolis.[1]

It is not sufficient to control the funerals of those who have died of the diseases mentioned. Other members of the family where the communicable disease is, may die of non-communicable disease; but public funerals in such cases would be dangerous, hence in Providence "the funeral of any person who has died while any member of the family is sick with smallpox, scarlet fever, measles, diphtheria, and membranous croup shall be private."

Responsibility for Violation of Rules. The responsibility for the violation of funeral rules may be placed upon the relatives of the deceased or upon the undertaker, or as in Providence upon the clergyman. Usually the responsibility of a private funeral is placed upon both the family and the undertaker as in the Pennsylvania law in Appendix 72. For illegal acts connected with the immediate care of the body, the disinfection and closing of the coffin, etc., the undertaker alone is usually held responsible, while for the use of a church the sexton or person in charge is at fault, and for the improper use of carriages the owner or driver. Sometimes the persons attending the funeral are liable as in Somerville. In some cities as Fall River the undertaker is required to notify the family in regard to the rules governing the funeral. The penalty for violation of these rules is often quite high as $300 in Denver[2] and $250 in Milwaukee.[3]

Anyone interested in this subject should study the entire set of funeral regulations contained in the Pennsylvania law and shown in Appendix 72.

Transportation by Common Carrier. Much attention has of late been given to the transportation of bodies by common carriers, particularly the transportation of bodies of persons dead of communicable diseases. This matter has been frequently discussed at the conferences of the state boards of health and has also been considered by the baggage agents and the undertakers. The state officials have been particularly anxious to guard against the carrying of communicable disease

[1] Minneapolis, Ordinance of 25 June, 1897, Sec. 20.

[2] Denver, Ordinances (1893), Chapter 44, Sec. 25.

[3] Milwaukee, Report of Health Commissioner, year ending April, 1891, page 21.

from one state to another, and the railroad officials have sought to protect their employees and patrons. The rules known as the Nashville Rules were adopted at a conference of the state boards of health, the National Funeral Directors' Association, and the American Association of General Baggage Agents. These rules are given in Appendix 73. They have been adopted in substantially their present form by the railroads represented by the baggage association and by a considerable number of states.[1]

In most cases these have been adopted as rules of the state board of health.

Some states also have other rules on this subject. In Vermont the transportation of bodies dead of smallpox, cholera, typhus fever, yellow fever, diphtheria, and scarlet fever is forbidden. In California and Maine bodies of persons dead of communicable disease are to be transported only with the permit of the state board of health, and in Massachusetts only with a permit from the local board without other restrictions. In Arkansas, Connecticut, Florida, New Jersey, and New York such bodies may be transported only when disinfected and in hermetically sealed caskets. In Ohio, Tennessee, Virginia, and West Virginia a similar rule is in force, but the method of disinfection is prescribed, and it is also required for bodies dead of other diseases if the time to the point of destination is over eighteen hours. The form of permit used under these rules in many states is very large and cumbersome and is printed on yellow paper, while permits for non-communicable diseases are printed on white paper.

STATUTES CONSULTED IN THE PREPARATION OF THE CHAPTERS ON COMMUNICABLE DISEASES.

ALABAMA. General, and quarantine, Code (1896), Secs. 2392–3, 2403–7, 2429, 2436, 2439.
Quarantine, Code (1896), Secs. 245–51, 2001–8, 2395–2400, 2409–2427. Act of 23 February, 1899.

ARIZONA. General, Penal Code (1887), Secs. 633,640; Chapter 29 of 1899.

CALIFORNIA. General, quarantine, Political Code (1886), Secs. 2798–3063, Penal Code (1886), Secs. 220, 373.
Vaccination, Political Code (1886), Secs. 2993–4; Chapter 24 of 1899.
Antitoxin, Chapter 39 of 1895.

COLORADO. General, quarantine, vaccination, Act of 17 April, 1893.

CONNECTICUT, General, General Statutes (1888), Secs. 2603, 2606.
Notification, Chapters 77 of 1895, 146 and 242 of 1897.
Funerals, Chapter 155 of 1893, (also rules of state board of health.)
Quarantine, General Statutes (1888), Secs. 2594–2602.
Vaccination, General Statutes (1888), Secs. 1747, 2137, 2607.
Antitoxin, Chapter 252 of 1895.

[1] Alabama, Colorado, Delaware, Illinois, Indiana, Iowa, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Montana, New Hampshire, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, and South Dakota.

DELAWARE. School attendance, vaccination, Act of 21, March, 1883.
General, Revised Code (1893), p. 298, (Laws of Delaware, Vol. 16, Chapter 345).
Quarantine, Revised Code (1893), p. 362, (Laws of Delaware, Chapter 46).

DISTRICT OF COLUMBIA. General, Act of 3 March, 1897.

FLORIDA, General, quarantine, Revised Statutes (1892), Secs. 764–72; Chapter 34 of 1899.

GEORGIA. General, quarantine, Code (1882), 1375 to 1393.
Vaccination, Act of 20 December, 1897.

IDAHO. Revised Statutes (1887), Sec. 1153; Act of 13 March, 1899.

ILLINOIS. Powers of cities, Annotated Statutes (1896), Chapter 24, Sec. 63, *seventy-eight.*

INDIANA. Act of 28 April, 1899.

IOWA. Code (1897), Secs. 2564–75.

KANSAS. Inoculation, General Statutes (1897), Chapter 100, Sec. 321.
Quarantine, General Statutes (1897), Chapter 75, Sec. 17.

KENTUCKY. Legislation, Statutes (1894), Secs. 2044, 2055, 2059.
Quarantine, Statutes (1894), Sec. 2049, 2056, 2062.
Vaccination, Statutes (1894), Secs. 4608–14.

LOUISIANA. Chapter 192 of 1898.
Vaccination, Chapter 80 of 1877.
Warning sign, Chapter 115 of 1882.
Quarantine, Revised Laws (1884), Secs. 3022–62.

MAINE. General, quarantine, Revised Statutes (1883), Chapter 14; Supplement Laws (1885–95), Chapter 14.
Vaccination, Revised Statutes (1883), Chapter 11, Sec. 87, VIII; Chapter 213 of 1889, and 172 of 1893.

MARYLAND. General, Public General Laws (1888), Art. 43, Secs. 8, 14–34; Chapter 346 of 1898.
Quarantine, Public General Laws (1888), Art. 41, Sec. 71.

MASSACHUSETTS. General, Public Statutes (1882), Chapter 80, Sec. 39 *et seq.* Chapters 98 of 1884, 102 of 1890, 188 of 1891, 138 of 1885, 101 of 1886, 302 of 1893, 198 of 1885, 400 of 1895, 211 of 1885, and 420 of 1891.
Vaccination, Public Statutes (1882), Chapter 47, Sec. 9, and Chapter 80, Secs. 51 and 53; Chapters 515 of 1894, and 496 of 1898.
Quarantine, Public Statutes (1882), Chapter 80, Sec. 62 *et seq.*; Chapter 79 of 1893.

MICHIGAN. General, vaccination, quarantine, Compiled Laws (1897), Secs. 4412, 4424–54, 4460, 4471–83.

MINNESOTA. General, vaccination, quarantine, Statutes (1894), Secs. 7045–79; Chapter 176 of 1893.
Warning sign, Chapter 133 of 1897.

MISSISSIPPI. Annotated Code (1892), Secs. 1008–9, 1405–6, 2278.
Quarantine, Chapter 79 of 1898.
Vaccination, Chapter 69 of 1896.

MISSOURI. Revised Statutes (1899), Secs. 5281, 5457, 5508, 5961, 5962, 7518–29, 9764.

MONTANA. Penal Code (1895), Secs. 674, 694.

NEW HAMPSHIRE. General, vaccination, Public Statutes (1891), Chapter 110, Chapters 30 of 1893, and 100 of 1899.
Vaccination, Public Statutes (1891), Chapter 110, Sec. 1; Chapter 93, Sec. 2.
Quarantine, Public Statutes (1891), Chapter 111; Chapter 30 of 1893.

NEW JERSEY. General, General Statutes (1895), p. 1644, Sec. 49, III., XIII., p. 1645, Secs. 52–57; p. 1675, Secs. 221–26.
Vaccination, General Statutes (1895), p. 1639, Secs. 21–26.
Antitoxin, General Statutes (1895), p. 1649, Sec. 84.

[illegible]

[illegible] Secs. 227–31.

[illegible] Chapter 107 of 1897.

[illegible]

[illegible] Public Health [illegible]

[illegible] Public Health Law, Secs. 80–131g).

[illegible]

[illegible]

[illegible]

[illegible] 2135–6, [illegible]

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[illegible]

[illegible] Chap- [illegible]

[illegible] Chapters [illegible] and [illegible]

[illegible] Chapter [illegible] Sec. [illegible]

[illegible] Act of 7 January, 1895, Secs. [illegible]

[illegible]

[illegible] Secs. [illegible]

[illegible]

[illegible]

[illegible] Secs. [illegible], 541, 545, 4327–[illegible]

[illegible]

[illegible] Sec. 1110.

[illegible] quarantine, Statutes (1894), Secs. 4673, 4680–89.

[illegible] quarantine, Code (1887), Secs. 1496, 1719–28; Chapters [illegible] of 1895–6, and 1146 of 1899–1900.

[illegible] Code (1887), Secs. 1733–41; Acts of 30 April, 1877, and 16 January, 1896.

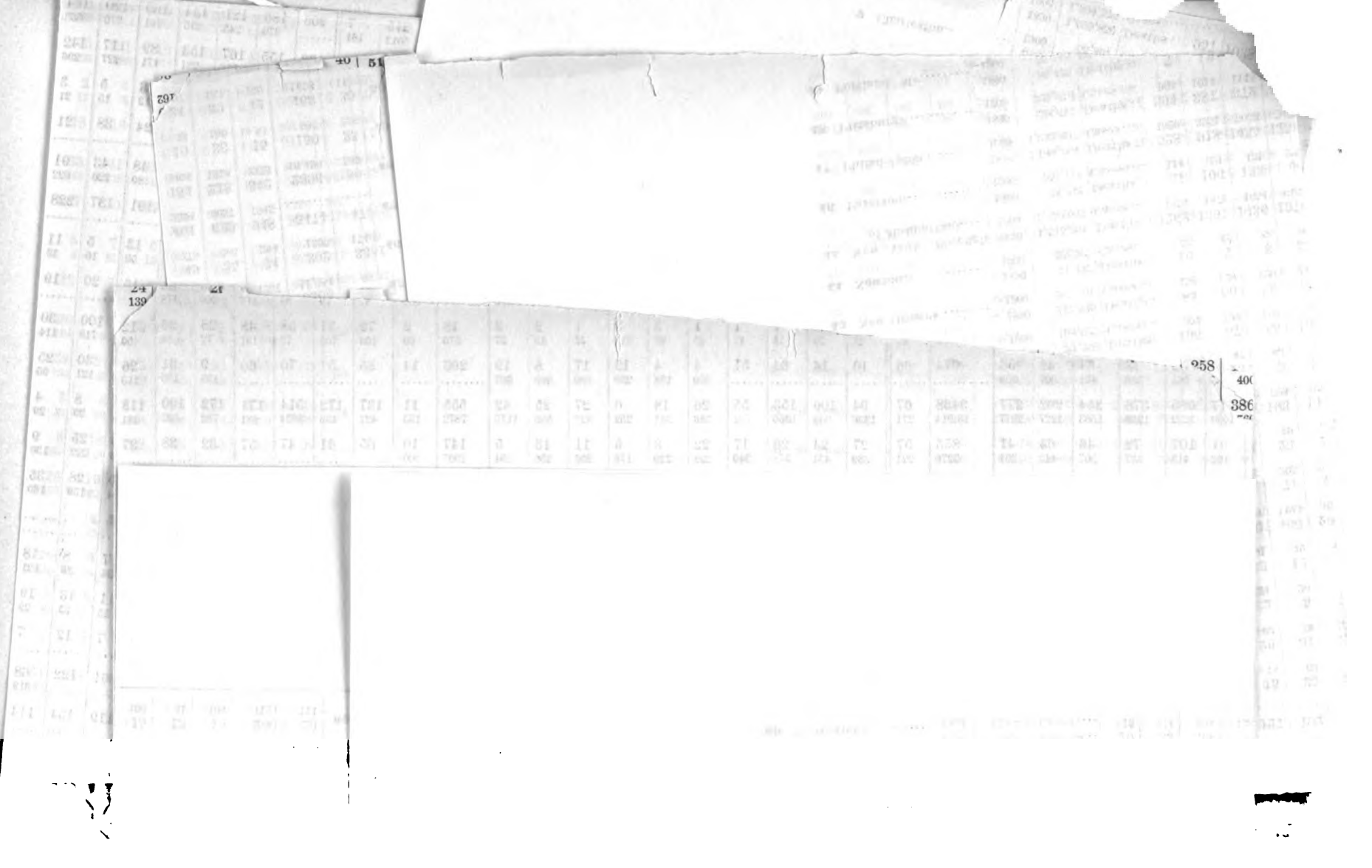
WASHINGTON. General, quarantine, Codes (1899), Secs. 739, 1238–42, 2972–3009

Notification of Tuberculosis, Chapter 71 of 1899.

WEST VIRGINIA. Code (1899), Chapter 150.

WISCONSIN. Statutes (1898), Secs. 1408, 1412a–1416, 4602, 4608d.

WYOMING. Chapter 76 of 1899.



CHAPTER X.

COMMUNICABLE DISEASES

(CONTINUED).

ADMINISTRATIVE WORK.

IF the community intends to do anything in the way of official control of communicable disease it is necessary for a sanitary officer to visit the infected premises to leave directions for the management of the case and to see that whatever is required is done. In small communities this work of course falls upon the health officer and is indeed his first and most important duty. In cities in which the health department is of sufficient importance to warrant the employment of subordinate officials to assist the health officer, the work of medical inspection as it is properly called is placed upon an officer especially employed for that purpose, called a medical inspector, or in some cases these duties may be performed incidentally by other subordinate officers. The following shows the number of medical inspectors in some of our larger cities and what salaries they receive:

City.	Number of Inspectors.		Annual Salary.
Boston	1	medical inspector	2,200
	1	medical inspector	1,400
Brooklyn (Borough of)	1	chief medical inspector	2,500
	2	diagnosticians	1,800
	2	diagnosticians	1,200
	17	medical inspectors	1,200
Buffalo	1	medical inspector	1,000
Cambridge	1	medical inspector	3,000
Chicago	1	chief medical inspector	2,000
	10	medical inspectors	900
	10	medical inspectors (in winter)	900
Denver	2	medical inspectors	900
District of Columbia	1	medical inspector	1,500
Hartford	1	medical inspector	600
Milwaukee	5	assistant health commissioners	900
Minneapolis	3	assistant health commissioners	1,000
New Bedford	1	medical inspector	500
Newark	1	medical inspector	1,000

City.	Number of Inspectors.		Annual Salary.
New York (Borough of Manhattan)	1	chief medical inspector	$2,500
	2	diagnosticians	1,800
	1	diagnostician	1,500
	1	diagnostician	1,200
	17	medical inspectors	1,200
Omaha	1	medical inspector	1,200
Philadelphia	1	chief medical inspector	2,300
	4	assistant medical inspectors	1,200
Pittsburgh	1	medical inspector	2,400
Providence	1	medical inspector	1,500
Rochester	1	medical inspector	1,000
St. Paul	1	medical inspector	720
Salt Lake City	1	medical inspector	720

As cases of communicable disease are likely to come to light at any time of the day or night, the health department is kept open during the whole twenty-four hours of every day in the year in the great cities, and even in such cities as Detroit and Pittsburgh. In smaller places night calls are so rare, and the medical inspector or similar officer so well known, that in emergencies it is expected that he will be sought at his home.

When a report of communicable disease is received at the health department it should be placed in the hands of the medical inspector as soon as possible. There is some advantage in allowing the inspector to take with him the original report sent in by the physician. By so doing he may be better able to correct errors in the name or address which are likely to occur and thus save valuable time. This is done in St. Paul. If it is done of course the report should first be recorded in the office. It may be at once entered on the permanent record which should be kept by every health department of all cases of communicable disease reported. If the inspector comes regularly to the office he of course gets his report then. In New York the inspector calls at the office twice a week only, and the reports in the morning's mail are delivered to him before nine A. M. by the police. In Boston a mimeograph list of the names and addresses of the sick is sent out daily at noon so that it is received by the inspectors at about two P. M. The reports received later are sent to the inspectors by mail.

In many cities the original returns are at once filed and a blank form or report containing the name and address of the patient is given to the inspector. In many cases the blank carried by the inspector is the one that shall serve as a full report or perhaps a permanent record of the cases as will be referred to below. Sometimes, as in San Francisco and Buffalo, a simple slip is given him on which he is to make a report stat-

ing briefly what action he took, and giving the name, age, and address of the patient and the name of the physician.

In almost all cases the health officials accept the diagnosis of the attending physician who reports the case, though in Seattle the health officer visits and confirms the diagnosis in every case reported.[1] In Cambridge the medical inspector sees each case, but keeps his opinion to himself unless called upon by the attending physician. Even when the case is discovered in other ways, if there is a physician in attendance it is usually considered good policy to consult him in regard to the diagnosis and not attempt to officially investigate the case.

More trouble occurs from diphtheria than any other disease. In diphtheria health officers from the attention that they have given to the subject and their familiarity with the evidence, recognize the diagnostic significance of the diphtheria bacillus. Practicing physicians, on account of a more limited observation and because of an occasional failure of the method, frequently do not consider that this organism is a safe, or perhaps even useful aid to diagnosis. Sanitary officials have therefore generally come to think that whenever diphtheria bacilli are found in the throat or nose of a person, that person should, so far as his relation with the public is concerned, be treated as if having diphtheria, and it is the usual custom to treat the case in this way no matter what the opinion of the physician may have been, and no matter if he adheres to it after the culture has been taken. On the other hand the health officer is perfectly ready to treat the case as diphtheria when the attending physician reports it as such, when no culture has been taken, or even if when a culture has been taken no diphtheria bacilli are found. As it is well known that through errors of technique or from other causes the bacillus is not found on the first culture in ten per cent. or more of the cases of true diphtheria this position of the health officer is perfectly logical. Sometimes those physicians who have no confidence in bacteriology are very ready to take advantage of the situation when the bacilli do not happen to be found at first, even if they really believe the case to be diphtheria, and refuse to take another culture, saying that the "health department has decided that it was not diphtheria," and that therefore they will not report it as such. The writer takes every occasion to urge a second and perhaps a third culture in such cases, and usually if the case warrants it they are taken. Personally the writer has never seen a case of what he believed to be true diphtheria which did not show diphtheria bacilli on the third culture, and probably three negative cultures may be very safely relied upon.

While it is unwise for the health officer, except when sure of error

[1] Letter from Health Officer, 1895.

or deceit on the part of the attending physician, to personally investigate the case, yet it is sometimes necessary. Moreover, cases are constantly occuring in which communicable disease is suspected when there is no physician attending. It has been deemed wise therefor to give the sanitary officers authority to investigate such cases. On page 112 reference was made to statutes which confer authority to enter private property to investigate nuisances, and some of these are so worded as to permit the exercise of the same right for the investigation of communicable diseases. The Massachusetts law has been copied by other states and probably allows and requires the exercise of this power.[1]

Other states, among which may be mentioned Indiana, Maryland, New Hampshire, New Jersey, North Dakota, Ohio, South Carolina, Texas, Virginia, and West Virginia, have either by statute or by rule of the state board of health authorized local boards to examine into cases of suspected communicable disease.[2] In Texas permission must first be asked before the forcible entrance is made. In West Virginia the officers may not enter at night for this purpose. The rules of the Indiana state board of health grant the right of examination only when there is no physician in attendance or when the physician fails to report. The North Dakota rules add that the health officer must "in no way interfere with the treatment of the case." The charter of New York City authorizes the inspection of cases for diagnosis.[3] In New

[1] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 28:

"The board shall examine into all nuisances, sources of filth and causes of sickness."

[2] New Jersey, General Statutes (1895), p. 1645, Sec. 45:

"That all police justices, recorders, justices of the peace and all other magistrates are hereby authorized on complaint founded on information and belief, supported by oath or affirmation of any officer or agent of the state board of health or of any local board of health that there is in any dwelling house, store, stable or any building of any kind whatsoever any nuisance affecting health or any person sick of any contagious or infectious disease, or any condition of contagion or infection which may have been caused by any one recently sick of any such disease in such dwelling house, store, stable or any other building, to issue a warrant directed to the sheriff of the county within which such complaint shall be made, or to any constable, marshal, police officer or to any officer or agent of such board of health directing him, them or any of them to search in such dwelling house, store, stable or other building for such nuisance affecting health; or for any person sick of any contagious or infectious disease, or for any condition of contagion or infection which may have been caused by anyone recently sick of any such disease in such dwelling house or other place as aforesaid, and if such nuisance be found, to abate the same; and if such sick person be found, to deal with him according to law and the ordinances of such board of health; and if such condition of contagion or infection be found to exist, to destroy the same by means of proper disinfection.

[3] New York, Chapter 378 of 1897, Sec. 1184:

"The sanitary superintendent, the assistant sanitary superintendents, the sanitary inspectors and the officers of said department may visit all sick persons, who

Hampshire the authority to enter private premises is granted only to inspectors appointed by the state board of health. A number of cities have similar provisions in their ordinances. In Maryland the state board of health is to decide questions of diagnosis.[1]

While in ordinary cases the diagnosis of the attending physician is usually accepted, it is by no means so with hospital cases. If the city officials are to remove a case of communicable disease to a hospital it is prudent for them to be as sure as possible that the case is sent to the right ward. It is unfortunate to send a scarlet fever case to a diphtheria ward or chicken pox to the smallpox hospital. Therefore in hospital cases the patient is usually examined by the medical inspector before being placed in the department ambulance. In New York special medical inspectors are detailed for this and are called diagnosticians.

In all cases it is necessary for the medical inspector to exercise the utmost care and judgment so as not to irritate in any way the family of the patient, or the attending physician.

In the District of Columbia and Philadelphia penalties are imposed for the obstruction of an officer while discharging the duties above referred to, and in Philadelphia if an aggrieved person after recovery assaults an officer he is to be fined and imprisoned.[2]

The first thing to be done by the medical inspector on making his visit is to enquire as to the facts of the illness, its duration, origin, etc., the age and other items concerning the patient that it is desirable to record, and also to note whatever is necessary in regard to the other members of the family. As the laws concerning the disease are often applicable to all members of the family and to all children living in the house, enquiries must be made of the other families living in the house. It is wise to visit the other families first if this is possible, but if not, as is perhaps usually the case, the inspector should not enter the infected apartments so that he may not be obliged to go directly from an infected to an uninfected family. It is possible (though improbable) that he might thus convey the disease, but it is chiefly for the moral

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shall be reported to the department of health as sick of any contagious, pestilential or infectious disease and report to the department of health, in writing, his or their opinion of their sickness."

[1] Maryland, Chapter 346 of 1898, Sec. 34E:

"All questions of doubt concerning the cause or nature of any sickness believed or suspected to be of an infectious or contagious character, shall be referred to the state board of health; and the said board shall be authorized to employ a competent bacteriologist to conduct inquiries into the nature, source and vehicles of infectious disease."

[2] Pennsylvania, Act of 29 January, 1859, Sec. 28.

effect that he should thus respect isolation. The data needed for record and as a basis for giving directions for management may be taken on a special slip from which they may be copied on to a record book, or they may be taken down upon a printed form which shall serve as the permanent record.

After thoroughly examining into the necessary facts the medical inspector gives directions as to isolation and disinfection. To aid in this most health departments furnish printed circulars which the inspector may leave with the infected family and perhaps with other families in the house and neighborhood, as in Detroit and Reading. In Louisville circulars are not distributed at all. As such circulars of directions may well be uniform for all communities, and as small communities could not well afford to print them, they are furnished by many state boards of health.[1]

Sometimes, as in Connecticut, a card is furnished to be hung in the sick room on which are printed in large type the more important regulations. In cities with a large foreign population circulars are often printed in different languages. Sometimes a polyglot circular is issued and sometimes a separate circular in each language. Examples of such circulars are given in Appendices 74–80.

Besides leaving circulars which contain general directions, it is of course the duty of the medical inspector to give specific directions for the isolation and general management of the case in question. The varying regulations of different states and cities for the control of the patient, the family, and persons living in the house, have already been considered. It is the duty of the inspector to explain all these matters, and to see that they are thoroughly understood. He must also make it understood that the rules are to be obeyed. Usually these directions are given verbally, but the rules of the Iowa and Vermont state boards of health require that they shall be in writing. In Iowa the notice is to be in the name of the mayor or township clerk and is to be served upon the family. In Vermont the notice is issued over the signature of the health officer and is served upon the head of the family. See Appendix 81.

Sometimes while no formal order for isolation is served, a printed notice in regard to school attendance is left at the house. This is done in Reading, Yonkers, and Charleston. See Appendix 82.

In Providence it has been the custom for the police to call on the day following the visit of the medical inspector and further insist upon

[1] California, Colorado, Connecticut, Illinois, Indiana, Iowa, Maine, Maryland, Michigan, Minnesota, New Hampshire, New York, North Carolina, Rhode Island, Tennessee, Virginia, and Wisconsin.

the measures of isolation ordered. It is believed that the duty of obedience is thus more forcibly inculcated.

Occasionally a short printed notice of some one regulation may be left when it is desired to issue a special warning or when the regulation has been markedly disregarded. Such singling out of a flagrant act is more effectual than to trust to the warning of a general circular of directions.

It was formerly the almost universal custom of medical inspectors to make quite a thorough "sanitary survey" of the infected house and note all nuisances, defective plumbing and drainage and filthy conditions in or about the premises. This was done as a result of the teaching of the early European sanitarians that the infectious diseases were largely filth diseases. These inspections carried on systematically have only served to prove that these teachings were not correct. At present very many health officials have discontinued all enquiries into "unsanitary conditions" because it is feared that if emphasis is laid upon such defects the family will feel that the disease is not due to contagion purely, and will be only too ready to attribute its presence to the parsimony of the landlord, rather than failure on their part or their neighbors to maintain isolation. The health officer wishes to have nothing weaken the belief that the contagious diseases are contagious. Inspection of the house is very generally omitted in scarlet fever, diphtheria, smallpox, and measles, but it is very generally made in typhoid, for the mode of transmission of this disease is not yet fully understood and it is very possible that "unsanitary conditions" may sometimes be a factor in its spread. Indeed it is known that the contamination of drinking water with sewage is sometimes a factor. In some cities the inspection of the premises where there is communicable disease is not made by the medical inspector but by the sanitary inspector, as in Chicago, Indianapolis and St. Louis, and a sample of the form used by the inspector in Indianapolis is shown in Appendix 83. In other cases the form used for this purpose also includes that portion of the history of the case which it is necessary to record. It is then made out by the medical inspector in full and returned to the office where the returns for the year may be bound together or otherwise filed. In Appendices 83–4 may be found a sample of the style of report which requires a very full examination of the premises.

In cities where very strict isolation is maintained and the wage earners are kept from work, it is necessary for the city to support the family when they are without means. This is done more in Detroit than perhaps any other city, and there the inspector is required to make a report as to the financial condition of the infected family.

After the medical inspector has left his circulars and given his directions and obtained the data for his report, he may put up the warning sign. This however, is sometimes done by sanitary inspectors or by the police, or by a man appointed especially for that purpose as in St. Louis. In Chicago, Cambridge, Minneapolis and St. Paul the cards are put up by the sanitary inspectors, in Pittsburgh and Detroit by the sanitary police.

When the inspector visits a case of diphtheria he should be prepared to take cultures from the throat or nose. Very often the attending physician requests that the inspector take a culture from the patient. In Philadelphia the board of health advertises to take cultures on request. In Providence, children living in the house are not permitted to go to school until negative cultures have been obtained from them, and persons living in the family with the case are not allowed to go to work until this has been done. Then, too, the inspector is likely to hear of suspicious cases of sore throat in the neighhorhood which are unattended by a physician, and which he should examine. He should therefore carry a number of culture outfits with him. Several ordinary culture boxes may be carried in the pockets, but if many cultures are to be taken, it is important to decrease the burden as much as possible. Hence swabs alone are sometimes carried in place of the complete outfit. If many tubes are to be carried, it is necessary to use a box or bag. When smallpox is prevalent, the medical inspector should be prepared to vaccinate as he may come across persons whom it is safest to vaccinate at once lest they escape from observation.

After his return to the office it is necessary for the inspector to send out various notices or to see that it is done by the proper clerk. The first and most important notice is that to the schools. Many of the state regulations, as those of Colorado, Maryland, North Carolina, Pennsylvania,[1] Tennessee, and Vermont, require the health department to notify the school department, and such a requirement is still more often found in municipal regulations. The efficient health officer would send such a notice even if he was not formally directed so to do, and this is probably the reason why the requirement is not universal.

[1] Pennsylvania, Chapter 124 of 1895, Sec. 14:

"It shall be the duty of the health authorities in the several municipalities as aforesaid, to furnish daily, by mail or otherwise, to principals or other persons in charge of said schools, a printed or written bulletin, containing the name, location and disease of all persons suffering from cholera, smallpox (variola or varioloid), scarlet fever, typhus fever, yellow fever, relapsing fever, diphtheria, diphtheritic croup, membranous croup or leprosy, upon receipt by them of reports of such cases from physicians as required in section one of this act: *Provided*, That the health authorities of any municipality may, in lieu of the daily bulletin herein required,

As a matter of fact various methods are taken to notify the schools. Usually whatever method is taken, the notices are sent daily, but sometimes as in Baltimore they are only sent twice a week. In Newark notices are sent to private schools three times a week. In some cases they are sent to the board of education as is required by the laws of Maryland, Tennessee (to the county superintendent if not in a town), and North Carolina. In Massachusetts the statute requires notices to be sent to the school committee. In several cities where it is not prescribed by law this method is followed, as in Bridgeport, Denver, Detroit, Fall River, Fitchburg, Newark, and Youngstown, O.

Notice reaches the teacher who is to enforce the law sooner if it is sent directly to the school where the pupils attend, and this can be readily done if the medical inspector obtains the facts at the time of his visit. This method of sending the notice directly to the school is probably the one generally followed.[1] When notice is sent to the school department of course a complete list of all cases is sent as in Detroit; but sometimes even then a separate slip is sent for each case as in Fitchburg. Sometimes when it is sent to the schools direct a complete list of all cases reduplicated on the mimeograph or hektograph is sent as in Boston and Baltimore. When notice is sent only to the school where the pupils attend, usually only the names of the children there attending are sent. Sometimes the Christian names of all the children are sent, but more often only the family name and the address. The form of card used in the District of Columbia is shown in Appendix 85. In Bridgeport what is practically a copy of the physician's report is sent to the school. Only the family name is used in Chicago, as shown in Appendix 86. This card is a double reply card and the reply card is used by the principal of the school to report to the health department that the notice was duly received. Sometimes a copy of the law is printed on the card. In Providence for scarlet fever the letters are in red, for diphtheria black, and still another style of card is used for measles. Notices are sent to parochial, private, and other secular schools in the same manner. Notices are frequently sent to Sunday schools but this is by no means universal. In Providence the Sunday school notices are sent to the pastors of the churches. In that city they are sent daily, but in Newark they are sent on Friday of each week. In some cities

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provide that a notice shall be given to the school or schools attended by the children in whose home or residence any of the diseases mentioned in this section exist, and prescribe the form of said notice."

[1] It certainly is in Albany, Boston, Cambridge, Chicago, District of Columbia, Minneapolis, New York, Philadelphia, Providence, Reading, Rochester, St. Louis, San Francisco, and Yonkers.

they are sent to the superintendents of the Sunday schools. The medical inspector also sends notices to the public and other libraries, and in those cities where wage earners are kept from work, notices must be sent to the employers. In Detroit the post office authorities are notified of cases of communicable disease. In Providence notices are sent to the day nurseries, in Chicago to milkmen, and to fresh air societies in New York. In Boston where the medical inspector does not visit the office each day a card is sent by him to the office recommending whether the patient should be removed to the hospital or kept at home. In case the latter is decided upon, the notice shown below[1] is sent to the attending physician.

After the infected house has been visited and the clerical work connected with the various notices has been done, it is necessary to make a record of the case, or at least to begin such a record which of course can be completed only with the termination of the case. The importance of keeping a good record of all cases of communicable disease cannot be overestimated. There are a great number of unsolved problems connected with the management of communicable diseases and a vast number of observations of the natural history of these diseases must be made before satisfactory solutions can be reached. The importance of keeping such records has been recognized in the statute law of several states and it is required in Maryland,[2] Massachusetts, North Carolina, New Jersey, and South Dakota.

[1] Office of Board of Health,

Boston,_____ 189

Doctor_____

I have just now made an official visit at the house of your patient _____ at _____ for the Board of Health. It will be my duty to coöperate with you in maintaining the necessary isolation of the patient, and, on notice from you or the family of the termination of the disease, to see the patient and certify the facts required by the Board of Health for its action.

Respectfully,

_____

Agent, Board of Health.

[2] Maryland, Chapter 346 of 1898, Sec. 34C:

"The Boards of Health in the several cities, towns, and counties shall cause a record to be kept of all reports received in pursuance of the preceding sections and such record shall contain the names of all persons who are sick with infectious or contagious diseases, the localities in which they live, the disease with which they are affected, together with the date and names of the persons reporting any such cases, and the record of quarantine, disinfection and other preventive measures."

In Massachusetts the record is to be in books furnished by the secretary of state. In New York City a similar book is used. Two books are used so that inspectors may not be delayed and the records are entered twice a week when the inspectors call at the office and are signed by them. Another book which is practically a street index also has all the cases entered in it. A separate book is used for the cases which go to the hospital.

Another form of record consists of the report of the inspector upon a sheet which is filed, and perhaps bound, and thus serves as a permanent record. These may be indexed by streets or names, or both, or arranged according to one method and indexed by the other. Such forms are used in cities where the sanitary inspection of the infected house is made a feature of the work. Examples of these forms are shown in Appendices 83–4.

A very convenient form of record is the card record. These cards may be arranged according to streets or by names, or there may be a set arranged each way. In Providence experience has shown that there is little need for any other that a street index. The form used in Milwaukee is shown in Appendix 87, blue for diphtheria, red for scarlet fever, buff for typhoid, and white for measles and other diseases. Of course the items differ somewhat in the different diseases. The record is compact and there is a considerable number of items, more than there is room for on most of the book records, but not as many as it is well to record.

In Providence a compromise form of record is used. It is used like a card in that the sheets are arranged alphabetically by streets. They are kept in a drawer with a board upon them to keep them flat; but as they are of the thickness of ordinary paper they can be easily folded and carried in the pocket. The medical inspector takes blank ones with him and fills them out as fully as possible, and he also takes them with him when he makes any subsequent visits. All the cases of all diseases under observation are kept in a pile together, arranged by streets. When a case has terminated the slips for each disease are kept separate. At the end of the year they are assorted and arranged in various ways for ease in making up tables and are finally bound. The form used in diphtheria is shown in Appendix 88. The scarlet fever slips are white, diphtheria green, and typhoid blue.

Another useful form of record and one generally used in conjunction with book or card records is the map. Maps are hung in the office and on these are noted all the cases of communicable diseases that come to the notice of the department. Sometimes a separate map is used for each disease and sometimes all are marked on one map, different colors

being used for the different diseases. Sometimes one map lasts for a whole year or for several years as the phthisis map at Rochester. Sometimes a new map is used for each month as in Baltimore, and in Providence a new one on which are marked all diseases, is set up every six months. In Providence the map is mounted over cork and is pasted only around the edges so that it may be easily cut off and filed away. Cases may be designated by spots of ink or pins or both. The most common way is to stick in a red headed pin for scarlet fever as near the location of the case as may be, a black pin for diphtheria and a white pin for typhoid. In Providence where the locations are marked by both ink and pins the scarlet fever and diphtheria pins are taken out when the cards are removed and a spot of the corresponding color is left on the map. The typhoid pins are left in as long as the map is in use and their location is marked with a T. In Baltimore a separate wafer of brown is stuck on the pins for every case in the house. As a new map is used for each month, the cases carried over from the preceding month are designated by a red wafer. When disinfected the place of the pin is marked in blue. Pin maps are exceedingly useful and sllow local outbreaks better than any other method. Such maps are used in Asbury Park, Baltimore, Cambridge, Denver, Montclair, N. J., New Bedford, Providence, Rochester, and doubtless in many other places.

To post a placard and exclude children from school may and doubtless does accomplish much; but unless something more is done, the patient and perhaps other members of the family may pay little heed to isolation. The laws almost invariably require that the patient and other members of the family stay in the house. This they will rarely do, particularly members of the family who are well, unless there is some supervision, and unless this supervision is constant it is scarcely possible to believe that our state and municipal laws are at all well enforced; and constant supervision is rare in American cities.

Even if there is only one other visit, a final one, before the card is taken down, it may do some good, for there may be a fear that violations of the law will be discovered; but this is often omitted even in such cities as Cleveland, St. Paul, Chicago, and Cincinnati. In Hartford also, only one visit is made at the beginning, but when the attending physician reports that the case is well the patient comes to the office of the medical inspector to show that desquamation has ceased or to have a culture taken.

In most cities at least two official visits are made to the infected premises, one when the case is reported and one when the warning sign is to be removed. In scarlet fever the object of the visit is to deter-

mine whether desquamation has ceased, and in diphtheria to take a culture from the throat. Of course, if the patient is not through desquamating or diphtheria bacilli are found, several visits may be required. Usually the first of these "final" visits is not made until a notice is received from the family or from the physician that the case is well and that in scarlet fever desquamation has ceased; but in Rochester it is the custom for the medical inspector to visit all cases after the expiration of twenty-one days.

In some cities a more complete supervision of the cases is maintained. In Baltimore frequent visits are made, and the same is true of Newport, R. I., Paterson, and Pittsburgh. A still better supervision is secured by daily visits. This is done in Wilmington, Del., where the sanitary inspectors (executive officers), do this work though they are aided by the police. In Detroit, where a stricter isolation is kept up in scarlet fever and diphtheria than in most cities, the inspector is sent to the house within three hours after the case is reported and then visits the house daily. He also makes a daily report to the central office as shown on page 497.

The only certain means of knowing that isolation is maintained as directed is to guard the premises day and night. This is rarely done in scarlet fever and diphtheria, though it is reported that in Pittsburgh it is done in perhaps five per cent of the cases; and it has been done in special outbreaks as in Salem, Mass.,[1] in diphtheria in 1896, and Columbus, Ind.,[2] in diphtheria in 1897. In Seattle a guard is placed day and night in diphtheria and occasionally in scarlet fever.[3] In the more feared diseases, as smallpox, typhus fever and yellow fever, it would doubtless oftener be done if it were not that most cases of these diseases are taken to the hospital. Occasionally, however, it is impossible to provide hospital care owing to lack of facilities, and it is then quite common to set guards about the premises. This method of isolation is specifically provided for in many state laws and was referred to on page 448. A similar authority is given by statute in Alabama and in Pennsylvania cities of the second class. When guards are employed they have to be kept on duty day and night and frequently more than one side of the house has to be guarded.

In Providence when it has been necessary to care for smallpox in a dwelling, a nurse has been furnished by the city and no other guard has ever been required, though it might be with certain classes of people. A similar practice is sometimes followed in Montclair, N. J., in cases of

[1] Salem, Report of Board of Health, 1896.

[2] Indiana Medical Journal, June, 1897.

[3] Letter from Health Officer, 1900.

diphtheria and scarlet fever among the poor. Not only are cases of smallpox thus kept under control, but in some cities all exposed to that disease are confined as in Cleveland, the District of Columbia, and Pittsburgh. In other cities as Newark and Providence, this is not done, though of course the exposed persons are kept under daily observation and are thoroughly vaccinated. It is believed in those cities that harsher methods only result in concealment and sometimes in the escape of the persons under suspicion.

For all this work of controlling isolation the regular police can be of great assistance to the health department. The officer on the beat frequently passes the infected premises, is often acquainted with the inmates of the house, and is very likely to detect any violations of the law and can report them promptly to the health department. In many cities the police are required by ordinance to co-operate with the health department.[1] In order to secure this co-operation on the part of the police in Providence, a slip naming the persons who are not to leave the house is sent through the chief to the officer on the beat, a green slip being used for diphtheria and a white one for scarlet fever. On receipt of the slip the officer visits the house and supplements the directions of the medical inspector with the authority of the law.

When a death occurs from communicable disease most regulations require that the funeral shall be private. The funeral can very generally be controlled through the undertaker, who is usually licensed by the municipality. If his license is issued by the health department his co-operation is likely to be all the more hearty. Some cities, however, do not rely on this alone, but have one or more inspectors attend the funeral. In Detroit, Lowell, Milwaukee, Newark, and Worcester, a single inspector is present, and in Toledo two inspectors. In Detroit a special "funeral inspector" is employed, and he assists in disinfection. In Providence, when it is suspected that there is an intention to violate the rules, two policemen are detailed for this purpose. The undertaker usually reports if he suspects a violation of rules is intended.

When the time approaches for the removal of the warning sign or the "raising of quarantine," as it is popularly called, it is necessary that a notice should be sent to the health department by the family or the attending physician. Of course, in the rare instances where inspection by the health officials is made frequently, such notice is not necessary: but in most cities this is not done, and when it is not it is very

[1] Providence, Resolution of the Board of Aldermen, 16 February, 1893:

"The chief of police be and he is hereby directed to furnish upon call of the superintendent of health, such police service in the care of contagious disease as the said superintendent of health may require."

generally the custom to leave a postal card with the family or with the physician, on which notice may be sent. In Cambridge a postal printed for this purpose and addressed to the health department is left at the house by the medical inspector on his first visit. In Cleveland a slip is left with the family of the patient, but the doctor's signature must be secured before it will be recognized by the health department. See Appendix 89.

In most cities the report of recovery is to be sent in by the physician instead of the family. In some cities, as St. Louis and Chicago, a formal request is made to the attending physician to send in his report. In the latter city a reply postal is used. See Appendix 90. In the District of Columbia postal cards of different colors are used for different diseases and in diphtheria the physician is to give the date when the membrane disappeared, and in scarlet fever when desquamation ceased. In Boston the physician reports to the medical inspector who visits the case to confirm the facts and report to the board of health.

As in most cities negative cultures from the throat are required before the release from isolation is given, it has gradually come about that the labor of taking these cultures has fallen chiefly upon the medical inspectors. When the attending physician chooses to take the final cultures he is permitted and sometimes encouraged to do so, but perhaps in the majority of cases he notifies the health department that he is through with the case and expects the department to take the cultures. This taking of cultures has become so important a part of sanitary work that in Baltimore a special "throat inspector" has been appointed for this, and in Rochester an "inspector of diphtheria." In Columbus, O., the medical inspector leaves the culture outfit at the house for the physician and calls for it the next day. In order to prevent too frequent calls for cultures from persons anxious to terminate isolation, some officers refuse to take a second culture within a week if the first shows that diphtheria bacilli are present. Some officers feel that cultures are called for too early and would fix a minimum time before which they will not be taken by the medical inspector. Sometimes in long standing cases the virulence of the bacillus is tested upon guinea pigs and the patient released from isolation if the bacillus appears to have lost its virulence. This is the custom in Brookline, Mass., but it is not often done, except in prolonged cases, for a negative culture is usually obtained before the animal test is completed. Furthermore, there is very grave doubt as to whether this test is of much value in indicating whether the bacillus is virulent to man.

In most cases the health department orders the "release of quaran-

tine," but in Iowa[1] it must be by order of the mayor or township clerk, but only after disinfection and on the approval of the attending physician. It is usually the custom for the disinfector to remove the warning sign when he has completed his work, but in cities and towns where disinfection is not compulsory, or is not done by the officials, the householder is directed by the health officer to remove the placard.

The medical inspector is not only required to keep a record of the cases visited by him but he is obliged in some of the larger cities to make daily or weekly reports to the department of the work done by him. In Buffalo and San Francisco a separate slip is turned in by the inspector for each case. In Philadelphia where a half letter sheet is used by the physician for reporting, there is a space on the back for the report of the medical inspector. A more elaborate form of daily report is used in the District of Columbia stating the number of houses visited and placarded and the number of cultures taken. In Minneapolis a somewhat similar report is made weekly.

When isolation in communicable disease is maintained by the sanitary officials with such rigor as to interfere with the work of the wage earners, the support of the family must be provided in other ways, and it should of course properly be provided by the municipality. Assistance may be and frequently is furnished by the poor department, but it is not usually done unless the family are at other times recipients. It appears to many much better for the health department to furnish assistance, and there are good reasons for not being too niggardly about it. If the family in which there is communicable disease is to be subjected to too great hardships on account of it, many such cases will surely be concealed. On the other hand, they should not be encouraged to expect too much from the community, and it is not easy to hit upon a happy mean.

Various states, as Massachusetts,[2] Michigan, North Dakota, and Virginia, have provided that the payment for the care of communicable disease shall be a charge upon the person sick or his parents or guardians, and that it shall not be a charge upon the city or state unless the patient is without property. The tendency of these laws is to treat the

[1] Iowa, Rules of State Board of Health, 24 February, 1899, Rule 12.

[2] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 83:

"All reasonable expenses which have been heretofore or may hereafter be incurred by the board of health of a city or town, in making the provision required by law for a person infected by the smallpox or other disease dangerous to the public health, shall be paid by the person himself, his parents, or master, if able; otherwise by the town in which he has a legal settlement; and if he has no settlement, by the Commonwealth, in which case the bills therefor shall be approved by the state board of lunacy and charity."

patients to whom aid is given as if they were paupers. It is questioned by many whether this is a wise course. If a family is by action of the community deprived of the support furnished by its wage earners should not the family be helped with some degree of liberality, and in such a way as to make them feel that they are not the recipients of charity?

In Providence when a family has to be helped in this way, owing to loss of wages, the amount given is paid "for services in the care of communicable disease." The theory is that if the patient was removed to the hospital, the city would have to pay for the care, in that city fifteen dollars per week. If by the wage earner remaining at home strict isolation can be maintained, the family receives a certain sum for exercising this care. The amount paid is seven dollars per week, or if the wages lost are less than that, the amount of the wages is paid. As this plan is less expensive than sending to the hospital, the taxpayers ought not to complain. In 1900 seventeen cases received $131 in this way. During the same period 147 patients at the hospital cost $6,943.61;

If absolute isolation is not maintained in these cases, the money is withheld by the health department and the family becomes dependent upon the poor department. In Detroit where stricter isolation is maintained than in most cities, for the year ending 30 June, 1899, support was furnished in 489 families at a cost of $4,617, in 60 of which $597.35 was for fuel. During the year there were 331 houses placarded for diphtheria and 251 for scarlet fever. In that city the quarantine inspectors, of which there are two, visit infected houses each day

"to find the necessities of each case, which are telephoned to the Clerk. From the number in the family and age of the occupants, the amount of each article ordered is determined. Each order received is carefully compared with the previous order in order that the city may not be imposed upon by over-stocking with things which are not needed. Every order is copied in duplicate, one going to the concern furnishing the goods, thence to the party receiving the goods, and one being retained in the office. The duplicate sent with the order is returned after filling and compared with the original, which is then used in checking the bill rendered by the contractor at the end of each month."

On the first visit, the financial condition of the family is reported on blanks furnished for the purpose. In Seattle, where also absolute isolation is maintained, in 1899 only $200 was expended in supplies for the poor, although there were in that city 84 cases of diphtheria and 112 of scarlet fever.

New Hampshire has recently recognized the justice of assisting persons confined owing to communicable disease:[1]

"Whenever any person or family is placed in quarantine by a board of health to protect the public against smallpox, scarlet fever, diphtheria, or other dangerous, infectious, or contagious disease, it shall be the duty of said board to assist such

[1] New Hampshire, Chapter 100 of 1899, Sec. 1.

person or family while in quarantine in such mannner as in the judgment of the board may be deemed wise or necessary."

The expense is to be charged to the health department and not to the poor department unless the persons are already paupers.

In Minnesota[1] the board of health while maintaining isolation may "provide necessaries for persons in poverty."

EPIDEMICS.

In the opinion of the writer the word epidemic should be rarely used as applied to an outbreak of communicable disease; the latter term is in most cases much to be preferred. The word is a popular one and as ordinarily used implies a condition of great and unusual danger. As that is undoubtedly its meaning, it cannot be accurately defined and the attempts to do so have been futile. The use of a word like this which is not capable of close definition should be discouraged by health officers and scientific men. It is used in this connection because it is here intended to refer to just those indefinite conditions of popular fear covered by the word.

To one who is conversant with sanitary laws it may appear that the authority to control persons and property which is conferred upon sanitary officers is very great, and is sufficient to meet any emergency. Nevertheless, the harm done by a great epidemic is so great both to the lives and business of a community, that it is often felt that very drastic measures may be permitted to prevent or check it. Impending pestilence is to be feared as is an invading army, and as in war a community is put under martial law, so in times of pestilence the sanitary authorities are sometimes given extraordinary powers in order the more successfully to fight the disease.

Sometimes these extraordinary powers are conferred upon the state board of health as in Indiana,[2] New Jersey,[3] Nebraska,[4] Maryland,[5] Minnesota,[6] Missouri,[7] Ohio,[8] and Wisconsin.[9] In Maryland the state board of health "shall cause all needful sanitary measures and precautions to be taken which the emergency calls for and which may be

[1] Minnesota, Statutes (1894), Sec. 7072.

[2] Indiana, Act of 4 March, 1893.

[3] New Jersey, General Statutes (1895), p. 1636, Sec. 8.

[4] Nebraska, Chapter 51 of 1899.

[5] Maryland, Public General Laws (1888), Art. 43, Sec. 8.

[6] Minnesota, Statutes (1894), Sec. 7045.
Missouri, Revised Statutes (1899), Sec. 7522.

[8] Ohio, Annotated Statutes (1900), Sec. 2143.

[9] Wisconsin, Chapter 24 of 1899.

consistent with law"; and there is an epidemic fund of $10,000 to be drawn upon with the approval of the governor. In Wisconsin and Indiana the amount available is $50,000. In New Jersey the state board of health may spend money in excess of the appropriation with the approval of the governor, the treasurer and the comptroller.

The greatest powers are however given to local health authorities rather than to state officials, for the real work of sanitary administration is chiefly in the hands of the former, and they are conferred by special acts rather than general laws. Examples of such powers are found in New York City,[1] Buffalo,[2] St. Louis,[3] Pennsylvania cities of the second class,[4] and New Orleans.

While the control of communicable disease is usually left to the local authorities, the advice and help of state and federal officials is often sought. Most state boards of health were established largely for the purpose of giving such advice. In the largest cities the health department is usually so well organized that such assistance is not often necessary, but in smaller places even in moderate outbreaks appeal is made to the state board of health for advice, and it is often asked that a state official be sent to thoroughly investigate the conditions and perhaps take charge of the outbreak. In Massachusetts the calls upon the state board are so numerous that a special bureau in charge of an experienced physician has been established to look after this work. As has been elsewhere shown, state boards are sometimes authorized to take the initiative if the local board proves inefficient. This is the case in Massachusetts, but in that state it is very rarely found necessary.

The federal government also through the marine hospital service sometimes advises or takes charge of local epidemics, as in Brunswick, Ga., in 1893, Birmingham, Ala., in 1898, and Hampton, Va., in 1899.

[1] New York, Chapter 378 of 1897, Sec. 1178:

"In the presence of great and imminent peril to the public health by reason of impending pestilence, it shall be the duty of the board of health, having first taken and filed among its records what it shall regard as sufficient proof to authorize its declaration of such peril, and having duly entered the same in its records, to take such measures, and to do and order and cause to be done, such acts and make such expenditures (beyond those duly estimated for or provided) for the preservation of the public health (though not herein elsewhere or otherwise authorized) as it may in good faith declare the public safety and health demand, and the mayor shall in writing approve. But the exercise of this extraordinary power shall also, so far as it involves such excessive expenditures, require the written consent of at least three members of the board of health, and the approval aforesaid of the mayor. And such peril shall not be deemed to exist except when, and for such period of time, as the board of health and mayor shall declare."

[2] New York, Chapter 105 of 1891, Sec. 236.

[3] Missouri, Revised Statutes (1899), Sec. 5457.

[4] Pennsylvania, Chapter 258 of 1895, Sec. 28.

This service is authorized by an act of Congress approved 15 February, 1893, which directs the supervising surgeon general to aid and cooperate with local boards in preventing the spread of communicable diseases from one state to another. Of course the federal officers cannot take entire charge of an outbreak in all its details without a request from the local authorities. Such request is sometimes made and it is a little curious that it has hitherto been from communities in the southern states, where sentiment is supposed to be the strongest against federal interference.

Smallpox.

It does not require many cases of smallpox to make an epidemic. The number of cases of scarlet fever or diphtheria which will be suffered in a community without producing the notion of an epidemic is very considerable, but if one-tenth as many cases of smallpox should appear, the place would be thrown into a panic at once. It is true that smallpox is usually a more serious disease than diphtheria, but there is no such difference as popular notion would indicate. Even a single case of smallpox in many small communities creates that state of mind which is characteristic of an epidemic, and renders it necessary to do most of the things which are required in an outbreak of real magnitude.

In *Public Health Reports*, 20 October, 1899, page 1765, may be found a very good account of methods which it is desirable to follow in outbreaks of smallpox. It is an account of what is attempted by the officers of the marine hospital service when they are called to take charge of an epidemic.

Discovery of Cases. As has been shown, physicians' reports are the chief source of official knowledge of communicable disease. Reliance upon such, however, is well known to be very unsafe. A study of outbreaks of smallpox and yellow fever will show that they almost always proceed from unrecognized or unreported cases. In many mild cases no physician is called and in such cases often no one is at fault. In other mild and doubtful cases when a physician is called, the report to the authorities is not made because the physician fails to make a correct diagnosis, or in rarer cases because he deliberately conceals the case. Sometimes even severe cases are concealed by the friends of the patient. Failure to diagnose seems to be almost as criminal on the part of the attending physician as deliberate concealment. It can rarely be that a suspicion of the true condition does not cross the physician's mind, and if it does it is his duty to immediately notify the health authorities of it, and let them assume the responsibility of the decision. When the courts will hold the physician to this responsibility there will be fewer outbreaks.

In mild outbreaks great trouble is experienced from the unwillingness of the public and often of the physicians to acknowledge the disease; the smallpox of 1899 as also the yellow fever of 1898 afford many examples of this. In Muncie, Ind.,[1] in 1893 photographs of the serious hospital cases were exposed in public to prove the diagnosis, but they were of little avail. In Warwick County, Va.[2] (in which is situated Newport News), in 1899 one of the county supervisors declared that the disease was not smallpox and that vaccination made it worse, and the board of supervisors declared that they would take no action at all. One of these supervisors had smallpox and tended his grocery store during the whole course of the disease. In Alexandria in the same year the city council refused to vaccinate the people, and the mayor advised the sick to eject disinfectors from the house.

In Boston, Columbus, O., and doubtless in other cities it is required that all cases of chicken pox be reported during smallpox outbreaks in order that the health officers may make the diagnosis. Even when this is not the law it is the custom during the prevalence of smallpox to call the attention of the board of health to all cases not typically chicken pox. In one year in Chicago 350 cases of suspected smallpox, which proved not to be that disease, were reported to the board of health. In Brooklyn in 1894 of 913 suspected cases reported 460 were not smallpox. During an epidemic many suspected cases are reported by the laity and sometimes on good grounds. Three out of five cases of smallpox which came to the writer's notice last spring were reported by laymen. Medical inspection of schools will in most American cities do little to discover smallpox, as the school population is so well protected by vaccination that a relatively small proportion of cases are found in it. House to house inspection is the only method during an outbreak by which concealed or unrecognized cases can be discovered. Such inspection should be repeated after a short interval. A partial inspection is sometimes carried on in conjunction with vaccination, particularly in the immediate neighborhood of the infection. Thorough house to house inspection is rarely adopted except when an outbreak has reached alarming proportions, and often not even then. Such an inspection was carried out in Birmingham,[3] Ala., in 1898, by the marine hospital service, the inspectors visiting every room in every house, and as a result forty-five cases of smallpox were discovered.

Isolation. In smallpox it is the universal custom to remove all patients to the hospital or else put guards about the houses. The former

[1] Indiana, Report of State Board of Health (1893), p. 103, *et seq.*

[2] Public Health Reports, Marine Hospital Service (1899), p. 624.

[3] Public Health Reports, Marine Hospital Service (1898), p. 247, *et seq.*

method is almost always to be preferred. In Brooklyn, Chicago, New Orleans, and Providence it has not always been insisted on if only one family occupied the house. In Providence in such cases the health department furnishes the nurse who does not leave the house and acts as guard. In Muncie domiciliary isolation was at first attempted, but the disease continued to spread until all cases were removed to the hospital, when it at once ceased, but perhaps the extension of vaccination had something to do with this result. Sometimes it is impossible on account of insufficient hospital facilities, and more rarely it is impossible on account of the forcible resistance of the friends of the patient. In Chicago in 1894 in one district, 122 cases were treated at home because of lack of hospital accommodations. The objection to removal to the hospital is in some cases not without reason, for the "pest houses" provided are sometimes a disgrace and not fit for the care of the sick. The removal of patients is sometimes accompanied with danger to the officials. In Muncie, Ind., in 1893 the ambulance attendants were twice fired upon and one was shot in the arm. In Milwaukee in 1894 such violent demonstrations were made that the removal had to be given up. The following is from the report of the Wisconsin Board of Health 1893–4, p. 56:

"On Saturday evening, August 25th, between four and five o'clock, one of the officers of the health department was sent to remove a patient, a child, from 561 Fifteenth Avenue, in the rear. The party of this place, undoubtedly led to do as he did by the influence above mentioned, had notified the quarantine officers that any person coming there to remove the child would be shot, and he procured a revolver and lay in wait for the health officer. A mob congregated, and when the ambulance drove up with a squad of twelve policemen violent demonstrations began, stones were thrown, the horses struck with the missiles, and a general melee commenced. The official in charge of the police stated to the health officer that he had not sufficient force to disperse the mob and he would not undertake to do so. The mob was armed with clubs and missiles, the horses were being constantly struck, the health officials resisted, and it was therefore impossible in the absence of a sufficient number of police to remove the patient. Not only is the health department prevented from removing the patient, but in the houses which have been quarantined, and from which patients have been removed, we are experiencing great trouble. Last night a mob, numbering in the neighborhood of two hundred people, congregated in front of 972 Orchard St., and avowed their determination to take away from the house the people who were there quarantined, and the guards on duty at that house, who are quiet, reserved, and respectable men, state this morning that they do not consider their lives safe unless some action is taken to protect them in the duties which they are called upon to perform. This same condition of affairs is a feature at several other houses on the south side."

When it is not possible to remove patients to the hospital, a guard should be placed at the house and kept there day and night. Usually two guards are necessary, one at the front and one at the rear. It is difficult to get reliable guards if many are required, and this is one of

the causes of the failure of this method of management. Some guards are liable to be negligent or bribable. The guarding should be begun promptly or it is of little use. In Chicago and Brooklyn in 1894, whenever a report of smallpox reached the health department, an officer was detailed with the medical inspector. In Muncie a guard-house was established in the centre of the infected district, telephone connection made, a captain of guards appointed, and all the guards were boarded and lodged at the guard-house, as was also the attending physician. While it is usually considered necessary to isolate suspects in smallpox in some places this is not done. The laws of a number of states, as those of Alabama, Indiana, Mississippi, Missouri, and South Dakota, require the isolation of all persons exposed to smallpox, and the time specified is fourteen days. This practice is also followed in a number of cities outside of these states. The suspects may be either removed to a detention hospital or (after the removal of the sick) be guarded at home. In Alabama it is not permitted to remove a suspect to the hospital if he is willing to pay for guards around his house. In Detroit, Milwaukee, and Rochester, unless the number of suspects is too great, they are generally removed to a hospital. In the District of Columbia a block of tenements near the smallpox hospital has been hired for this purpose. Among other cities whose recent reports show the isolation of suspects at home are Cleveland, Lowell, Minneapolis, New Bedford, Omaha, Pittsburgh, and St. Paul. Other cities, as Boston, Brooklyn, Chicago, Cincinnati, Newark, and Providence, simply keep the suspects under observation without placing guards, but of course they are first vaccinated. In Chicago they are revaccinated every four days until it takes or until the time for probation has passed, and the house is placarded, except in the "better class" of families. The duration of the observation of suspects is fourteen days in Alabama, Indiana, Mississippi, Missouri, South Dakota, Boston, Chicago, Minneapolis, Rochester, and St. Paul; seventeen days in Pittsburgh and Providence; twenty-one days in Brooklyn and Cleveland. Of course, when absolute isolation is maintained, it is necessary to furnish food, fuel and other necessaries to those confined. In Newark[1] in 1894 a room was hired for a general store and goods were bought at wholesale. A horse and wagon and two men were employed in making daily deliveries. Medical attendance must also be supplied, and in an epidemic special physicians are usually employed who do not visit other persons, but in Newark the regular physicians to the poor assisted in this. In Muncie the physician wore rubber coat, cap, and boots, and disinfected himself with cor-

[1] Newark, Report of Department of Public Health (1894), p. 20.

rosive sublimate solution after each visit. In Providence a linen duster or perhaps a suit of overalls and rubbers are worn.

The problem of furnishing hospital accommodations is often a difficult one. Every town of 25,000 inhabitants should have a good permanent hospital, but there are many larger than this without any. Even a hospital of reasonable capacity may suddenly become overcrowded so that more room has to be secured on short notice. In some states, as Massachusetts[1] and Michigan, local health authorities may seize buildings to be used as hospitals, and it would be well if this right was generally granted. In the summer time tents can usually be procured and rapidly set up, but in the winter something more substantial is required. "Portable hospitals" are advertised which can be put up in a hurry but are rarely used. One ward of this kind was set up at the Municipal Hospital in Philadelphia, but cost more, took longer to set up and was not so satisfactory as a similar ward constructed in the usual way. In some cities portable polling booths are used, and these in an emergency have been utilized as hospitals. Efficient men can however, construct a serviceable ward in a remarkably short time if only a site can be secured, and often the city owns land which can be used for the purpose temporarily. For examples of smallpox hospitals see Chapter XII.

There is sometimes considerable difficulty in guarding these hospitals. In Birmingham the plan was adopted "of surrounding the camp with a high barbed-wire fence; thirty feet within this fence a single wire was drawn to mark the dead line, beyond which no patient was allowed to pass, and in this space between dead line and fence the guards were stationed. At night the entire picket line was lighted by large gasoline torches, thereby enabling a small number of guards to effectually prevent the escape of convalescents."

In order to prevent the mingling of infected persons with the well, schools are sometimes closed, and in Muncie, in 1893, the authorities went so far as to issue the proclamation given below[2] and the public library gave out no books.

Vaccination. Vaccination is without doubt a most valuable means of preventing or stopping an outbreak of smallpox. If every person in

[1] Massachusetts, Public States (1882), Chapter 80, Sec. 43.

[2] Indiana, Report of State Board of Health (1893), page 109:

"No public meeting of any sort should be held. No exercises should be held in any church, lodge, opera house, ball ground or any place of like character Billiard and pool rooms should not be opened to the public.

"The people generally should remain at their homes as much as possible. Congregations of persons on the street should be avoided. The police have been directed by the police commissioners to see that no crowds collect on the streets. Loitering or loafing will subject parties to arrest."

a city should be properly vaccinated, there is little doubt that the outbreak would promptly come to a close; but in the present state of public opinion, assiduously cultivated as it has been by anti-vaccinationists, a satisfactory general vaccination is impossible except when the public is thoroughly alarmed, and even then it is accomplished with difficulty. Ordinarily all that can be done is to vaccinate the inmates of the infected house and perhaps those in the neighborhood, and those in whose company the infected person worked. All this should be promptly done after every case of smallpox. If the outbreak is severe enough to warrant general vaccination, effort should be made to have this done as rapidly as possible. Sometimes advantage can be taken of the fear produced by epidemics in other communities. Thus in 1885 when the New England states were greatly alarmed over smallpox in Montreal a general vaccination was undertaken in Providence. Ten physicians were employed who visited each house and offered free vaccination. Vaccinations were also done in all the large manufactories and retail stores and among railway employees. The school children were all vaccinated previously, as in Providence the law in regard to this is strictly enforced. The papers generally urged vaccination and circulars were distributed through the schools or posted on the city's billboards. By these efforts only about 16,000 persons were vaccinated out of a population of 118,070, which was not a very satisfactory showing. When smallpox actually exists as an epidemic, many more persons can be vaccinated even if no compulsion is used. It is best to employ as large a number of vaccinators as possible so as to render the population immune at the earliest moment. It is not always possible to obtain enough medical men, and in Birmingham, in 1898, the marine hospital service employed as vaccinators second course medical students at four dollars per day. Thirty vaccinators were employed for a population of about 50,000. In Chicago, in 1894, with a population of a million and a half, 500 vaccinators were employed. In Birmingham the vaccinators made a house to house canvass visiting every room. Each inspector carried a note book in which was recorded the name and address of every person, and the date of the last vaccination of such person, and whether or not such vaccination was successful. He was

"to vaccinate all persons who had not been successfully vaccinated within the last year, as evidenced by an examination of the scar in each case. . . . No certificate of vaccination was to be honored, and although this, at first glance, may appear an unreasonable and arbitrary ruling, still, when the facts are recalled that in all large towns there are usually some physicians who will give false certificates for a small fee; that there are many persons who will forge certificates; that certificates issued in good faith by reliable physicians may be given by their recipients to parties who have never been vaccinated, and, finally, that a certificate of

vaccination is no evidence that such vaccination was successful, the necessity of the above measures will be easily apparent.

"The inspectors were especially directed to be at all times courteous in their treatment of persons of all classes, to explain to those who objected, the necessity of the measure and report to me daily for prosecution by civil authorities, the names and addresses of those who refused to be vaccinated or to permit an examination of their vaccination marks."[1]

Smallpox had prevailed in Birmingham for a year and was very prevalent when the marine hospital service took hold in January 1898. Many persons had been vaccinated during the preceding months and by the time the house to house canvas was complete nearly every person in the city had been vaccinated. This, together with the removal of all patients to the hospital, resulted in the immediate cessation of the outbreak. In any considerable outbreak it is usually the custom not to allow the physicians who visit the sick to vaccinate except in the infected houses. In Baltimore, in 1899, thirty extra vaccinators, at a cost of $1,500, vaccinated 60,000 persons. In Nashville, in January 1900, thirty inspectors vaccinated 40,000 persons. In Lowell, in 1894, 26,685 vaccinations cost $3,686.

Disinfection.

Disinfection of both persons and things after cases of smallpox is usually thoroughly carried out. Those persons exposed near the patient are told to bathe, and are usually compelled to change their clothes and leave those they have worn to be disinfected. In Chicago the clothing they wear is sponged with corrosive sublimate before they leave the house. As smallpox usually occurs among the poor there is much material such as mattresses, comforters, carpets, and clothing which is not worth disinfecting and which is burned. Where there is no steam disinfecting plant, it is necessary to burn all of this material. In some cities, as shown by the reports of Augusta, Ga., Indianapolis, Louisville, Detroit, and Providence, such goods if destroyed are paid for by the city. If there is a steam plant, goods of this character if of any value may be steamed. In New Orleans where there was no steam in 1895, wash goods were boiled and left overnight in a solution of bichloride, 1 to 1,000. This can be done in all cities, but if steam is available, it is best to use that. There is considerable clinical evidence to show that sulphur dioxide is a good disinfectant in this disease, and though it has been very generally discarded for formaldehyde it is still used quite often in smallpox, as recently in Atlanta, Birmingham, Cincinnati, New Orleans, and Rochester. If sulphur is employed, large

[1] Asst. Surg. G. M. Magruder, Public Health Reports (1898), p. 247.

amounts are used and pains are taken to have the air of the room moist. Formaldehyde also is used. In cheap houses poorly built from which the gas quickly escapes, instead of gaseous disinfection, bichloride in solution may be applied with a pump such as is used for spraying trees. This was done in Birmingham, New Haven, New Orleans, Muncie, and Providence. For the better class of houses, employees are sent by the health department in Providence, Muncie, and Rochester to wash all floors, woodwork, furniture, etc., and to wipe the walls and ceilings. Particular attention should be given to the privy or water-closets, and, perhaps, as was done in Muncie, to the pump handle and the gate. In Augusta, Ga., houses are all kept closed for a month after disinfection.

The cost of outbreaks of smallpox is very great. Even in those where the cases are few in number and the general business interests of the community are not affected, the amount spent is usually many times greater than would be for scarlet fever or diphtheria. Thus in Atlanta in 1894 the cost of sixty-nine cases was $10,168.76, or $147.37 per case; in Lowell in 1894 for six cases $4,164.17, or $694.03 per case, and in 1899 for one case $499.46; in Newark in 1894 for 131 cases $24,572.69, or $187.58 per case; in Muncie in 1893 for 150 cases $23,217, or $154.78 per case; in New Bedford in 1893 for three cases $1,178.29, or $392.76 per case; in Toledo in 1897 for eighteen cases $3,456, or $192 per case; in Brooklyn in 1894, exclusive of hospital treatment, for 453 cases $27,041.14, or $59.69 per case; in Montclair, N. J., in 1898 for one case $263.50; in Providence in 1899 for five cases $734.14 or $146.83 per case; in Augusta, Ga., in 1899 for 196 cases $4,000, or $20.41 per case; in Portland, Ore., in 1899 for ten cases $815.89 or $81.59 per case; in the District of Columbia in 1898–99 for ninety-eight cases $25,785.70, or $262.08 per case; in Columbus, O., in 1899 for seventy-five cases $42,750.85, or $570.01 per case. The cost of maintaining the elaborate smallpox hospital in Chicago in 1899 was $16,560, and only twenty-one patients were cared for. But a general communicable disease ambulance service is also maintained at the stable which consumes a considerable part of the expense.

Yellow Fever.

This is the most difficult disease that public health officials have to deal with. Very little is known with definiteness about the manner in which it is spread, the nature or location of the poison or the duration of infection in the individual. The diagnosis also is difficult. Public alarm is so great on the advent of the disease, and business so greatly

injured, that there is more temptation to conceal this than any other disease. The one great ally of the health officer is frost, which over almost the whole of the United States aids him in suppressing this as it does no other disease. Popular fear of this disease is so great that a single case occurring in any community in the United States may fairly be said to constitute an epidemic.

The writer has had absolutely no experience in the management of outbreaks of yellow fever and hesitates to describe the methods that have been adopted to meet it. What is here noted is taken largely from the reports of the marine hospital service setting forth what has of late years been done and what is advised by that service. Officers of this service were detailed to assist or direct the outbreaks at Brunswick, Ga., in 1893, Biloxi, Miss., New Orleans, Memphis, and many smaller places in 1897 and 1898, and at Hampton, Va., in 1899.

The management of yellow fever in an infected community of course consists in the application of the principles of isolation and disinfection. Often cases can be discovered only by house to house inspection which may have to be repeated as in Hampton, Va., in 1899; Brunswick, Ga., in 1893; and Memphis, in 1897. Colored physicians are said to be extremely useful for this work among the colored population. Removal to a hospital is desirable as in all other communicable diseases, but can be less often practiced in yellow fever than in smallpox for the disease pursues a rapid course, and except in early stages removal is more dangerous for the patient than in the exanthemata. In Brunswick, in 1893 there was no hospital, and in New Orleans in 1897, of 386 cases, but 202 were treated in the hospital.

If the patient remains at home all persons except those needed to care for him are removed to the detention hospital, the house is placarded and guards usually placed around it. Guards are not allowed to go freely about the town but must sleep in a guard-house. They are if possible to be immune. The following was the method employed in New Orleans, in 1897:[1]

"A guard was stationed to watch the premises by day and by night, and no one was allowed to enter or leave without a permit, and no such permit was given unless the applicant for same had had yellow fever; he must have taken a bichloride bath, 1-2000, and had been furnished from the outside with an uninfected suit of clothing. If the suit could not be obtained from without, the clothing of anyone about to leave the infected premises had to be exposed to formaldehyde fumes for six hours, using about one gallon of the standard formaldehyde solution to each 25,000 cubic feet of air space. When practicable, disinfection of clothing by immersion in a solution of bichloride of mercury 1 to 1,000, followed by careful drying was preferred.

[1] Louisiana, Report of State Board of Health, 1896-7, p. 76.

"No one was allowed to enter the infected premises except physicians and nurses, and minister or priest, and even they were not allowed to come and go at will, unless they conformed with the Board of Health regulations."

The care of the sick is usually taken in hand by the sanitary officials. In Brunswick 245 nurses were employed and thirteen physicians. There were 1070 cases of the disease. Most of the nurses were paid $1.50 per day. Near of kin were not employed, but usually a patient was nursed by a friend.

In any extended outbreak of yellow fever there is sure to be much distress, and relief must be furnished to those in need of food and clothing. This relief is usually in the hands of the health department, or at least is given only under its direction.

After the recovery or death of the patient the premises must be disinfected. For bedding, carpets, and textiles generally, burning is very generally practiced unless the articles are of considerable value. These articles should be replaced by the sanitary authorities. Indeed, the practice of reimbursing for all loss or injury during disinfection was quite generally followed during the last yellow fever outbreaks. Textiles that are not burned should of course, be steamed. The house is generally treated with formaldehyde or sulphur dioxide, or both, but a more satisfactory method is to drench it with bichloride solution. Prolonged airing is also efficient. Cheap houses are often destroyed. The surrounding ground requires special treatment in yellow fever:[1]

"The premises outside the houses must be made clear of trash — chips, leaves, pieces of board, etc., rotting wood being believed to be an especially bad nidus of infection. The mere wetting of these things as they lay with bichloride solution is not thorough disinfection, the underside seldom being reached by the solution.

"It is an injury to wet leaves of living plants with bichloride of mercury. It kills the leaves, etc., and after a rain has washed the bichloride off these dead leaves are a good nidus (culture medium) for any infection not destroyed, as on the underside of the leaf. It is not reasonable to believe that the living leaf would serve such an end.

"E. The thorough wetting of the cleaned ground, ditches, etc., with bichloride solution or covering it with chloride of lime is doubtless efficient, but unquestionably the disinfection of the outside premises by fire is the method of election.

"This is best done by the Barber asphalt furnace as used by Farrar in New Orleans in 1897, which is fairly manageable."

This latter method of disinfection has been used in New Orleans and will be described in the pages devoted to the consideration of disinfection. Of course vaults and drains must be disinfected also. In New Orleans in 1897 not only were the infected premises, but also the whole block disinfected in the manner described above, 14,120 premises

[1] Report of Supervising Surgeon General, Marine Hospital Service (1898), p. 357.

being so treated. The character and extent of the disinfection may be inferred from the amount and kind of materials used.[1]

In 1899[2] the board of health not only disinfected yellow fever premises, but also advised by means of a circular that all houses be treated in the same way where there had been cases of fever concerning which there had been any suspicion. It was advised that the houses be freely opened during cold weather.

Typhoid Fever.

The most important thing to do in outbreaks of typhoid fever is to seek out the cause and if possible, remove it. The principal recognized sources of typhoid fever are contaminated water, milk, and occasionally other kinds of food. Too often when the source of the infection is discovered all the harm possible has been done. Sometimes the infection is found to still continue, and it should, if possible, be stopped or the public warned against continuing the use of the contaminated water or food. If milk or other food is found to be the source of the trouble it can usually be protected against further infection. If wells or springs are infected their use can be stopped. In the case of a contaminated water supply the public can be warned to boil the water before drinking it. But the health department will not do its whole duty unless it makes every effort to have the public supply put in the best possible condition. Public sentiment should be aroused to demand that water should be filtered or the source changed or such other steps taken as may be needed to render the water safe.

Whenever an exceptional amount of typhoid occurs the health officer should be alert to discover its cause at the earliest possible moment. The reports of many cities show that health officers have often successfully investigated outbreaks of this disease. Often the local health

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[1] Louisiana, State Board of Health Report (1896–7), p. 82:

DISINFECTANTS USED DURING THE YELLOW FEVER EPIDEMIC OF 1897 IN NEW ORLEANS.

Formaldehyde	6,727½	pounds
Chloride of Calcium	924	"
Bi-chloride of Mercury	1,743	"
Muriate of Ammonia	1,743	"
Muriatic Acid	4,270	"
Sulphur	550	"
Lime	4,391	barrels
Chloride of Lime	21,793	pounds
Carbolic Acid	16¼	"
Wood Alcohol	106	gallons
Copperas	260	barrels

[2] New Orleans, Report of Board of Health (1899), p. 17.

officer finds it advisable to call in the assistance of state officers because they may have more experience in such matters or because it is necessary to go outside the municipality to seek for the cause. The Massachusetts state board through its agent Professor William T. Sedgwick, has been very successful in investigating these outbreaks, and perhaps the methods employed can be best indicated by narrating the incidents of one of these investigations. The example taken is that of Springfield, where the outbreak was studied by Professor Sedgwick and the local health officer, Dr. W. H. Chapin. The account is from the twenty-fourth report of the Massachusetts state board of health (for 1892), page 715.

During August, 1892, a large increase in typhoid fever was noted in Springfield, and it was also noted that the increase was confined to one district, known as the McKnight district. The local health officer promptly began to seek out the cause of the disease. Various theories were advanced, the most tenable of which was that it was due to contaminated milk. The health officer investigated the milk supply, but, misled by false information, found out nothing. At this juncture the assistance of the state board of health was asked for. A detailed investigation of the history of each case was then begun and the results recorded on the blank shown in Appendix 91. In such investigations Professor Sedgwick considers "the fixing of the precise time of infection is of supreme importance for the investigator, and this may often be obtained with considerable accuracy by the date of the physician's first visit or the time of the patient's taking to bed. The former can usually be got from the attending physician; the latter, in a surprising number of cases with tolerable accuracy, from the patient or his friends. The location of the patient when attacked is also highly important, as possibly indicating the place of infection, the place of work, business or school, giving alternative information of the same nature. The symptoms are asked for partly as a matter of routine, partly to get the patient or his friends to talk and so disarm suspicion, and partly for use when it is denied that the epidemic is real."

In the Springfield outbreak, after nineteen houses in the infected district had been visited and forty-six cases examined, it became clear that all theories hitherto advanced were untenable, except the milk theory. The cause could not be the city water supply, for the outbreak was localized in one district, and it could not be due to open sewer manholes in the streets for the same reason. There was no more defective plumbing in the houses than in others where there was no fever. A considerable number of the patients drank no well water. It was not due to infected fruit, vegetables, or ice, for those attacked did not have

[illegible]

[illegible] chart was made [illegible] sick. The facts [illegible] on map and chart [illegible] man's milk. It [illegible] fected. At first the dealer [illegible] producers from [illegible] farm was located and it was [illegible] fever" there early in the spring and [illegible] fever later. There were two possible ways discovered [illegible] have become infected. The contents of the privy were spread [illegible] near the well and the men walked over this in going to the well and their boots were rinsed off on the planking over the well [illegible] the water below. In this water *bacilli coli communis* were found. The cans of milk were cooled in this well and it was found that the water leaked into the cans. Another chance for contamination was directly from the infected hands of convalescents. Owing to the false statements of the dealer it was only with great difficulty that it was determined that the milk from this particular farm went to the infected district. It was necessary in order to show this, to cross-question his assistants and to examine the books of the farmers who supplied him and the books of the Co-operative Milk Association.

Typhus Fever.

This has of late been a rare disease, the only notable outbreak for a number of years being that in New York City in 1892. The first cases were among Jewish immigrants chiefly in lodging houses. During February 10 and 11, sixty-seven cases were discovered in these houses and removed to the isolation hospital on North Brother Island:[1]

"All other immigrants who had been exposed to the contagion were removed from the different houses already named, to No. 5 Essex street and No. 42 East Twelfth street, where they were put under close sanitary surveillance. For this

[1] New York, Report of Health Department (1892), p. 122.

purpose a detail of policemen from the sanitary squad was made, and orders given them to permit no person to enter or leave either building without a permit in writing from the chief inspector of the division of contagious diseases. At first this was effected by stationing one officer at each house, and relieving him every eight hours. It subsequently became necessary to double this force, stationing two officers at a time, and it was deemed wise to relieve them from duty at four-hour intervals. The officers were warned of the danger of contracting the disease, and were instructed to keep outside of the houses except in case of necessity requiring their presence within the buildings. Notwithstanding precautions taken to prevent it, cases occurred almost daily in both these houses. As the occurrence of these cases continued after the period of incubation, dating from the segregation of the suspects in these two houses by the department order, it was deemed wise to vacate both houses and to continue sanitary observation of their occupants on North Brother Island.

"The first case occurring among the residents of New York, presumably from the contagion brought here by the Hebrews, was that of Max Busch, carpenter, employed in the Thalia Theatre. He was taken sick February 19th at No. 53 Bowery, a lodging house, and was removed to Bellevue Hospital.

"After this secondary cases occurred in a number of houses scattered in various parts of the city. Three cases were received from ships in quarantine. The following very remarkable fact reflects credit on the efficiency of the department: the total number of residents who contracted typhus fever before June 1st was seventy. Of this number ten contracted it from contagion in No. 53 Bowery (lodging house), three cases were found at No. 39 Hester Street (a tenement house), four cases were found at No. 240 Cherry Street (a tenement house). These were the only houses in which more than one case occurred. The remaining fifty-three cases were in fifty-three different houses. In other words, in only three of fifty-six houses did more than one case occur."

"A description of the means taken to prevent the spread of typhus fever in this outbreak is of interest. These means are twofold, and while they seem simple and easy of application, their detail is exceedingly minute and must be carried out to a degree of perfection. They are as follows:

1st. Isolation of persons sick with the disease and those who have been exposed to its contagion.

2d. Thorough disinfection of all infected rooms and materials.

"The first means was accomplished, as has already been described, by the removal of persons sick to the hospital for contagious diseases, and by the segregation of the so-called "suspects" in two houses, and their subsequent removal to North Brother Island. The second means was effected, first, by thorough fumigation of infected rooms and materials in them with sulphur burned in accordance with the rules of the American Public Health Association. The sulphur is placed in iron receptacles, which are suspended in water, so that the heat from the burning sulphur causes a certain amount of steam to be evaporated from the water, and this adds moisture to the fumes given off by the ignited sulphur. In addition to this, the sulphur is ignited by means of alcohol poured over it. The burning of the alcohol adds also to the moisture given off by the steam. The amount of sulphur used is three pounds to every 1,000 cubic feet of air space to be fumigated. After fumigation, the infected rooms were thoroughly aired, and the walls, ceilings, and floors subjected to disinfection with a solution of bichloride of mercury. The strength of this solution was one part of mercury per five hundred of water. After this treatment the rooms were again fumigated in the manner already described, after which they were again aired, and the walls, ceilings, and floors scrubbed with soap and water. All portable materials, such as baggage, bedding, etc., were then

moved by means of the department wagon to the disinfecting depot at the foot of East Sixteenth street, where they were subjected to disinfection by means of dry and moist heat, in a special chamber built for the purpose, and described in the annual report of the board of health for 1890. The two houses, No. 42 East Twelfth street and No. 5 Essex street, in which the "suspects" were segregated while in the city proper, were not permitted to be occupied for human habitation until a period of fourteen days had elapsed. During this period the windows were kept open so as to permit thorough airing of the dwelling."

Two cases were on one day found in the alcoholic ward of Bellevue Hospital. One of them had been there five days. During this time, seventy-four persons had been exposed in the same ward and had been discharged. Sixteen left the city, thirty-eight could not be found, and only twenty were found by the inspectors, who endeavored to locate them all. No case developed among them so far as known. On another occasion a case was found in one of the general wards of the same hospital. "No visitors were allowed in the ward for three weeks, and a list of all the occupants with their addresses was furnished the department, and notice given by the warden when any one was discharged from the ward. An inspector was then sent to find him, if possible, and keep him under observation."

Scarlet Fever and Diphtheria.

Usually about the same procedure is followed in extended as in mild outbreaks of these two diseases. It is very seldom that the public evinces alarm and demands or permits the adoption of unusual methods. Isolation and disinfection are the remedies that are relied on. It is true that in diphtheria antitoxin is a valuable prophylactic; but unfortunately it is expensive, not easily administered, and its prophylactic effect is transitory, lasting perhaps a month. So far as the writer knows it has never yet been used for the general immunization of a community, though it has been used in this manner in infected families and institutions with markedly beneficial results. In scarlet fever no means of immunization is known. Usually in severe outbreaks of these diseases the health officer can and does secure a stricter enforcement of existing laws than at other times. Sometimes popular alarm results in the improvement of methods long known by the sanitary department to be defective, but continued because of the apathy of the public, the council, or the legislature. An epidemic of these commoner diseases sometimes results in a better organization of the health department, a larger appropriation, the purchase of an ambulance, or a disinfecting plant, or the construction of a hospital. Sometimes new and more stringent regulations concerning isolation are adopted. More often the health officer merely secures better enforcement of laws sim-

ply because he has the active approval of the public, the press, and the physicians.

Local outbreaks of scarlet fever and diphtheria frequently result in the closure of schools, sometimes by the health department and sometimes by the school department. If a number of cases of these diseases occur simultaneously or in rapid succession in a given school, it is often an indication that there is in the school an unrecognized source of infection. Sometimes this is by the circumstances rendered almost certain. It is usual in such cases to close the school for a few weeks and to disinfect it as completely as possible. In Providence, schoolrooms are disinfected by, first, the application of formaldehyde gas; second, the washing of all desks and other woodwork with a solution of corrosive sublimate one to one thousand; third, all the books, pencils, papers, and kindergarten materials are removed in baskets, and either burned or submitted to the action of steam. In that city it is rarely that schools have been closed and disinfected. Usually if it is suspected that a school is infected, a thorough inspection is made, and in diphtheria, cultures taken, and all suspicious cases kept out of school. The writer believes that with an efficient medical inspection of schools, closure will rarely be necessary.

As in smallpox and yellow fever, so probably in scarlet fever and diphtheria it is mild and unrecognized or unreported cases which are the chief cause of their spread. Nothing new has of late years been learned concerning the recognition of cases of scarlet fever infection, but it is otherwise with diphtheria. The use of the microscope leads in this disease to the discovery of many persons who are infected though sometimes perfectly well and who may give the contagion to others. In families, in schools, and in institutions, the use of the swab and microscope should be of great value in checking an outbreak. There have been instances in Baltimore, Denver, Providence, and doubtless other cities where a routine examination of all the children in a given school has resulted in the isolation of the source of infection. In Asbury Park[1] besides a regular medical inspection of the schools and cultures from all suspected cases, there was practiced a weekly disinfection of the schoolrooms with a bichloride spray. After spraying the desks and wookwork were wiped off and the floor swept. When diphtheria appears in an orphan asylum, reform school, or similar institution, it is extremely difficult to get rid of it, and, in many such, it has continued epidemic for a long time, perhaps years. It is now customary in such cases to take cultures from all the inmates and isolate all who have diphtheria bacilli in their throats. In Providence this method was

[1] New Jersey, Report of State Board of Health (1896), page 157.

followed in two institutions with the result that the disease disappeared, but in one of them several successive negative cultures were taken from both throat and nose. In two other instances in that city this method was not successful. The most conspicuous instance of failure after very great effort, was in a state institution at Owatonna, Minn.[1] Here diphtheria has existed for several years, notwithstanding the practice of ordinary methods of isolation. It was finally determined to pass all members of the school through a "filter." A number of rooms were selected, in each of which a single pupil was placed and retained there until six successive negative cultures were obtained from both nose and throat. All members of the school were passed through these isolation rooms. Of course, thorough disinfection of clothing and rooms was also practiced. Nothwithstanding these efforts, it was found that diphtheria bacilli could be detected in a number of the members of the school and cases of the disease have since occurred there.

Cholera.

Since the discovery of the spirillum of Asiatic cholera, this country has twice been threatened by European outbreaks, once in 1885 and again in 1892, but the disease reached our shores only once in 1892, and then did not extend beyond a few cases in New York City. On both occasions of the presence of the disease in Europe, great alarm was felt in the United States and active precautions were taken to prevent its introduction and spread. The quarantine regulations will be elsewhere discussed. It has long been believed that a filthy condition of houses, yards and streets, vacant lots, and streams and ponds of water, conduces to the spread of this disease, and that if a community is kept clean cholera will not prevail to any great extent. Acting on this belief our cities in 1885 and 1892 made very great efforts to put themselves in "better sanitary condition" by a general house cleaning. Nearly all cities employed an additional force of inspectors and made house to house inspections. Owners were ordered to abate nuisances, put plumbing and drainage in order and cleanse their premises. In many cities considerable amounts from the public funds were spent in cleaning streets, removing filth from vacant lots or draining stagnant ponds, and distributing disinfectants. The following quotations from a report of what was done in Brooklyn[2] will serve as illustrations of the nature of the work done:

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[1] F. F. Wesbrook and L. B. Wilson, Transactions of American Public Health Association, Vol. XXV., p. 546.

[2] Preparation of Brooklyn for cholera, J. H. Raymond, M. D., Brooklyn Medical Journal, 10 September, 1892.

"For some time the efforts of the Department of Health had been directed to closing up the wells of the city, which at the outset of the undertaking numbered three hundred and sixteen, varying in depth from fifteen to one hundred feet. An analysis of the water of these wells showed that of the whole number, but seventeen furnished water fit for consumption. These were, of course, liable at any time to become contaminated. As a result of these efforts all the wells, but one, were closed.

"Special police force was obtained to make repeated examinations of the existing vaults, the exact location of which by street and number was known.

"The old fashioned method of emptying privies had been prohibited and the so-called 'odorless' was the only one permitted. The night soil was removed to farms and utilized as fertilizer, but arrangements were made by which, had cholera come, this would have been discontinued and the material would have been carried to sea in boats. This latter method of disposal was adopted in August, 1885.

"During the season of 1884 and 1885, twenty-three stagnant ponds were drained and filled; in the whole city there were fifty-nine filled at an expense of $35,108.85. The material employed for this filling was in every case fresh earth or clean ashes, no garbage or other decomposable matter being used in a single instance.

"During the two years the inspectors made 11,622 inspections of the plumbing in old houses.

"As sailors coming to the city were liable to find their way first to the lodging houses, special attention was directed to these. Nine of them with 532 beds existed in the city. These were thoroughly examined from cellar to attic, and when defects of plumbing, ventilation, or overcrowding were found, these were corrected. The disinfecting corps disinfected them thoroughly, and it was made a part of the inspector's duties to visit them often. The proprietors were summoned to the Health Office and instructed as to the necessity of cleanliness and of prompt notification to the Health Officer of all cases of sickness.

"The frequency with which disease has been spread by rags made it important to have these under surveillance.

"A census showed that there were 279 places in which rags were stored. In order to have the necessary control over them, the following ordinance was passed: 'Section 188. No person engaged in buying, selling or storing skins, hides, rags, bones or similar articles, or who has become possessed by purchase or otherwise of skins, hides, rags, bones or similar articles, for the purpose of selling the same, shall store or keep any of said above mentioned articles within the limits of the City of Brooklyn without first obtaining a written permit so to do from the commissioner of health of said city, the terms and conditions of which permit shall be strictly complied with by the person obtaining the same.' Of the 279 places, 113 were permitted to continue, the others were ordered closed as being unfit places for the business.

"Vacant lots have always proved a standing invitation to householders and others, who have filth to dispose of. To keep such spots in an inoffensive condition a force of thirty-two men with eighteen carts was kept employed from May 15 to December 1, 1885, in removing such filth wherever deposited, in streets, vacant lots or yards. Three thousand nine hundred and sixty-two loads of such material were removed by boat to sea. The cost of this service was $9,128.89.

"The total amount of money expended by the health department in anticipation of cholera over and above the regular salaries and expenses was $56,735.83."

In New York:[1]

"Early in September, it was decided, owing to the presence of cases of Asiatic cholera in the city, to stop the work of trimming the scows of the street cleaning

[1] New York, Report of Health Department (1892), p. 85.

New York Board of Health Department 1902, p. 216.

houses without delay. The remainder were ordered to make house to house inspection, searching for diarrhœal cases, and to investigate all cases where death from diarrhœal diseases had occurred, and also those who had visited the city dispensaries for treatment of diseases of a like character.

"When a case suspicious of cholera was reported to this division, the diagnostician was immediately sent, provided with a sterilized bottle placed in a wooden casing, prepared by the bacteriologist of the department, and a bottle of antiseptic solution to render the same aseptic, subsequent to the placing in it of a specimen of the vomit or diarrhœal discharge. If this specimen was procured, it was forwarded immediately to the laboratory of the department. The ambulance was then ordered to be in readiness to start at once.

"Upon a report being received from the diagnostician that the case was, in his opinion, suffering from, or dead of, the disease, the following line of action was taken:

"If the patient was dead, a coffin was placed in the ambulance.

"The ambulance, with the driver and helper, was notified by telephone to proceed immediately to the house, and the ambulance physician and the physician to establish quarantine started from the central office at the same time.

"The captain in charge of the precinct where the case occurred was notified by police telegram to detail a police officer for duty under the control of the physician in charge of the quarantine.

"Upon arriving at the house the driver, helper, and ambulance physician clothed themselves in their rubber suits before entering the apartment.

"The patient was placed in the large canvas bag, with a drawing string around his neck, and removed from his rooms directly to the ambulance, the phyician in attendance carrying the emesis basin to receive any vomits. The patient was placed in the ambulance and removed to the Reception Hospital, accompanied by the physician and driver. If the patient had succumbed to the disease, the body was wrapped in a sheet thoroughly saturated with a bichloride solution (1-500), placed in the coffin and removed to the autopsy room at the Reception Hospital.

"The helper remained at the house with the quarantine physician, prepared a large quantity of the solution of bichloride of mercury, and proceeded to disinfect the premises, under the direction of the physician, in the following manner:

"All bedding, clothing, carpets, and all textile fabrics in the room where the patient had been were saturated with a disinfecting solution; soiled bedding and infected clothing were placed in canvass bags, the carpets taken from the floor, and then removed in a wagon provided for the transportation of infected goods to the disinfecting station at the foot of East Sixteenth street and cremated.

"The walls, floors, and wooden furniture in apartment, the floors, surbase of halls, the floors, surbase, balusters, handrails of stairways, the door knobs, faucets of water-pipes, the seats and floors of water-closets, were all thoroughly scrubbed with hand brushes saturated with a disinfecting solution. The water-closet bowls and pipes were thoroughly flushed with a solution of carbolic acid or milk of lime.

"The room or rooms which had been occupied by the patient were fumigated (after the cracks of doorways and windows were made air-tight, having paper pasted over them) with burning sulphur (3 pounds to the 1,000 cubic feet). After this action had been taken the apartment was placed under strict quarantine, a police officer stationed in the hall on that floor, who allowed no one to enter or leave the apartment. Whenever it was necessary for any of the quarantined family to visit the water-closet they were accompanied by the physician in charge of the quarantine and reconducted as quickly as possible to their rooms. The quarantine physician then made a complete census of the occupants of the house — names, ages, occupation, and where employed — and sent postal cards to principals, notifying them to exclude from their schools all children residing in that house. He allowed no family

to remove their goods from the house without a permit from the Chief Inspector. He kept surveillance over the water-closets, noting any of the occupants who visited the same more than twice in twenty-four hours.

"All supplies for the family were purchased and paid for by the quarantine physician, who made a report of the condition of affairs every eight hours by telephone to the central office.

"This strict quarantine was maintained for seven days from the time the case or body was removed. Then all the persons under quarantine were required to bathe and dress themselves in clothing which had been disinfected by the department, and the clothing they had worn was left in the rooms, and they were required to leave the apartment.

"The rooms were again scrubbed with disinfectant solution and the apartment thoroughly fumigated with sulphur (3 pounds to the 1,000 cubic feet).

"For the next seven days the premises were visited by the quarantine physician once every twelve hours, and report made by telephone to the central office."

Tuberculosis.

The first step to be taken in the prevention of tubercular phthisis was the distribution of circulars giving information as to the contagious character of the disease and the means which should be taken to prevent its spread. Until within a very few years physicians have not generally considered this disease contagious, and even now a considerable number deny it. Thus in Denver in 1897[1] of 215 physicians, 16 unqualifiedly denied its contagiousness, and 16 more gave only a qualified assent. In this as on many other subjects the sanitary officials have been foremost in disseminating, even among the medical profession, the results of biological research. As early as 1890 a circular of information of this character was issued by the board of health of New York City. According to S. A. Knopf[2] circulars or similar publications are at present issued by the state board of health of twenty-two states.[3]

In some cities outside of these states, as St. Paul, Chicago, St. Louis, Minneapolis, and Philadelphia, similar circulars have been issued. Examples of these circulars are found in Appendices 93-95. In Minneapolis the circular is printed in the form of a card which it is intended shall be hung in the room of the sick person. An excellent criticism of these circulars, which it would be well for every one contemplating issuing one to read, may be found in Knopf's article in the Journal of the American Medical Association, 30 October, 1897. In New York

[1] Denver, Report of Bureau of Health (1897–8), p. 53.

[2] The Prophylaxis and Treatment of Pulmonary Tuberculosis (1899), p. 68.

[3] California, Colorado, Connecticut, Delaware, Indiana, Iowa, Kentucky, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New Mexico, New York, Ohio, Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin.

City these circulars are sent to the physicians, and distributed among the tenement house population. From 20,000 to 30,000 are distributed yearly. In Brookline, Mass., one is sent to every family in the town. In most cities a circular is sent only to persons who are reported as having phthisis.

The next step in the work of preventing pulmonary tuberculosis is the notification of cases. As was shown on page 438, this is now required in a few cities. The law, however, is not generally enforced, and unless it is proposed to do more then is generally done in the way of investigation, isolation, and disinfection by the sanitary authorities, there hardly seems to be much use in attempting to enforce it.

In Michigan the state board of health has prepared a blank on which the local health officer is to report all cases of consumption occurring in his township (this disease is to be reported by physicians in that state). A very extended report of the action taken by the patient, his attendants, and the health officer must be made to the state board of health on death or recovery.

The only way in which health officers usually learn of the existence of tuberculosis is by the death returns; but after the death of the patient nothing can be done except to disinfect the room occupied during the last sickness, or perhaps the whole apartment. This is done in Detroit, New York City, and Philadelphia. Besides this little is done in any city except New York. The board of health of that city is the pioneer of this work; but has not had the co-operation of a large part of the medical profession in the city. The work of this department is well set forth in a "Circular of Information for Physicians."

First. The sanitary code requires that all cases of pulmonary tuberculosis shall be reported, and, of course, that all deaths shall be reported. The authorities of public institutions are also required to report all cases entering and leaving the institution and the address from which they came or to which they are going. The cases and deaths are recorded on index cards, red for cases, and blue for deaths, which are arranged by streets. Before being arranged they are carried to the house to be filled by the inspectors if an inspection is made. See Appendix 96.

The cases are also noted from year to year on an atlas drawn to a scale of 100 feet to the inch. A different mark is used for each year. In Rochester a similar record has been kept of deaths since 1897 on a large wall map, pins of different colors for different years being used.

Second. In tenement houses and lodging houses (unless the attending physician requests not) an inspector is sent to the house to instruct the family and leave circulars. Subsequent visits are made and it is claimed by the board that they find that proper precautions are taken

in about one-half the cases. In cases residing in other than in tenements and lodging houses, no inspection is to be made unless the physician attending so requests.

Third. When a patient removes or dies the inspector reports to the board what disinfection is required, and the board issues an order to the owner of the premises to disinfect or rather to clean them. In some cases when it is believed that this order will not be promptly complied with, a notice is posted on the apartment stating that it has been occupied by a consumptive and must not be again occupied until disinfected. The disinfection required is to wash walls and all woodwork with washing soda, one-half pound to a pailful of hot water, and then re-paper, whitewash, and kalsomine. Occasionally goods are taken away and steamed.

Pennsylvania[1] has passed a law forbidding the employment by bakers of persons having consumption, and the Sanitary Code of Yonkers[2] makes it a misdemeanor for bakers or marketmen to pursue their occupation if they have this disease.

The importance of bovine tuberculosis in causing the human disease cannot be here discussed. The control of dairies to prevent the production of tuberculous milk and the effort to eradicate bovine tuberculosis are considered in other chapters. In New York City the board of education requires that applicants for position of teacher shall present a physician's certificate that they are free from tuberculosis.

If it is necessary to have isolation hospitals for smallpox, scarlet fever, and diphtheria, it is far more necessary to have them for tuberculosis, for the welfare of the patient depends upon hospital life far more than it does in the other diseases, and, as in other diseases, absolute isolation can rarely be obtained outside of a hospital. While the building of such hospitals has for several years been urged by boards of health, as yet very little has been accomplished in this direction. There are many successful private sanatoria,[3] but only two or three operated by cities or states. Massachusetts is the pioneer state as it opened its state tubercular hospital 1 October, 1898. The cost of the hospital was $180,878.85, of which $45,839.87 was for land, sewerage, etc., and $123,684.24 for buildings.[4] The following is from Knopf:

"The institution consists of a series of two-story buildings arranged in a half-circle, in the middle of which is the administration building. The pavilions are of

[1] Pennsylvania, Chapter 95 of 1897.

[2] Yonkers, Sanitary Code (1897), Sec. 28.

[3] See Knopf's Prophylaxis and Treatment of Pulmonary Tuberculosis.

[4] Second Annual Report, Trustees Massachusetts Hospital for Consumptives and Tuberculous Patients, p. 23.

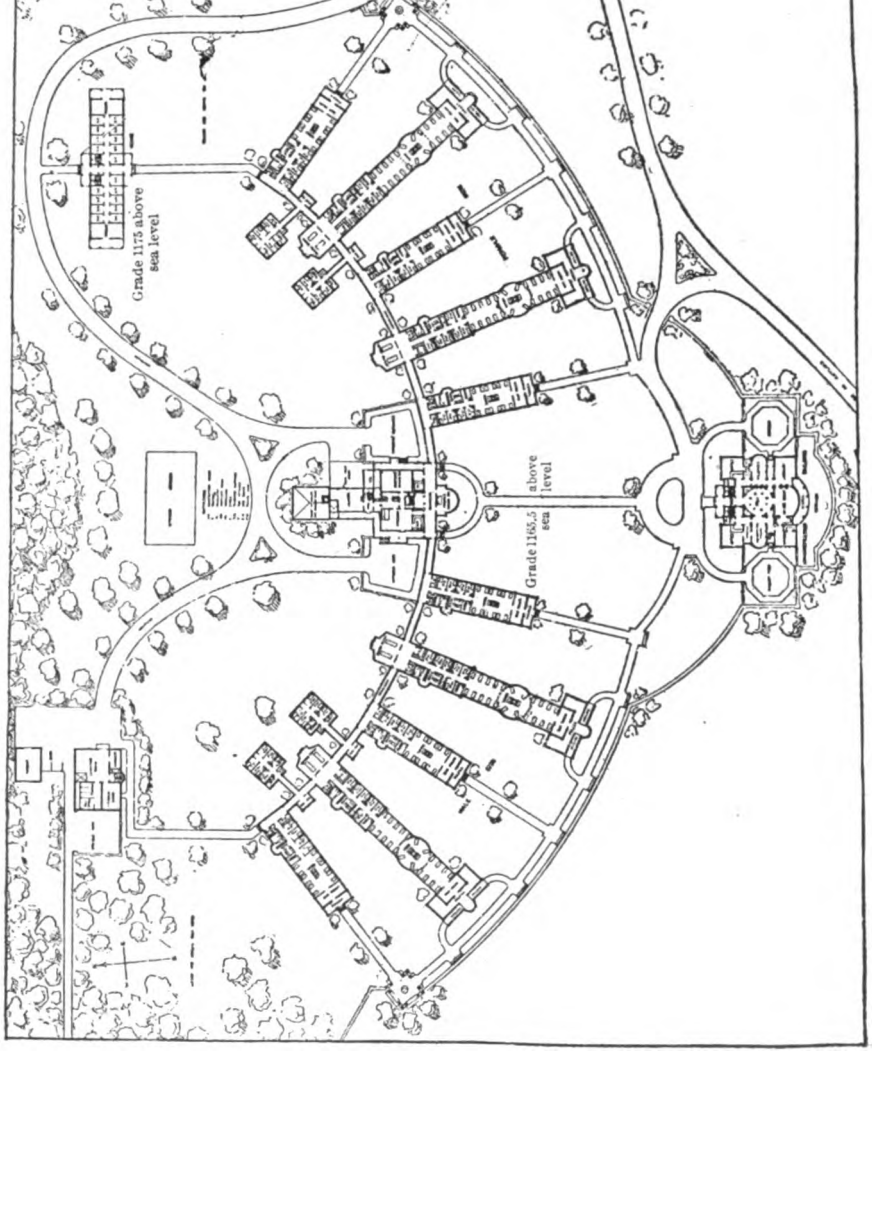

FIG. 17.

Plan of Massachusetts Hospital for Consumptives.

two kinds; some have seven small rooms and a large ward for twenty-two patients, and others have the same number of rooms, but the wards are smaller and can accommodate only ten patients. Each pavilion has a solarium made entirely of glass, and all the buildings are encircled by large verandas. The pavilions on one side of the administration building are for the women and those on the other side are for men. As the accompanying illustration shows, the buildings are all arranged so as to receive as much sun as possible. There are in all 200 beds. Patients can have their choice in regard to treatment — that is to say, whether they desire to have a regular or a homœopathic physician for their attendant.

"What makes this institution particularly interesting is that, inasmuch as its primary purpose is to arrest the disease, and if possible to extirpate it, only such patients will be admitted as are deemed not too far advanced to admit of reasonable hope of radical improvement. In no sense is the hospital to be considered as a home for the hopelessly sick; for, great as is the recognized need for homes of refuge for advanced consumptives, such service is manifestly incompatible with the even more needed service of rescuing lives that can be saved only by sanatorium treatment. 'Patients who do not improve after a stay in the hospital sufficiently long to test the effect of treatment will be advised not to remain, and their friends will be expected to arrange for their removal to surroundings primarily devoted to or better adapted to their comfort.' This is a clause contained in the opening announcement, and is one of the most distinct features of the work of the institution. The fact that the charges for patients are uniform and only fifty cents a day, that no private patient will be received, and that private rooms will be allowed only for physical reasons, and, finally, that no extra charges will be made and no fees and tips allowed to be accepted under any circumstances, makes this institution in the truest sense a philanthropical one."

The state of New York has this year (1900), made an appropriation for a similar hospital. The same state has also authorized cities of 250,000 inhabitants to establish phthisis hospitals of their own outside of their limits, but with the approval of the state board of health, and also of the local board of the town where the hospital is to be.[1]

Cincinnati in 1897 converted the smallpox hospital which is a substantial brick building into a hospital for consumptives. The hospital itself and the administration buildings cost, exclusive of the land, about $50,000. It accommodates about sixty to eighty patients, who come from among the poor, who would naturally seek admission to the general hospital. In fact this institution is primarily intended to afford a place where consumptives may be treated so that it may not be necessary for them to be a menace in other institutions. Most of the patients are too advanced to afford much hope of cure, but under the excellent management of Dr. Lyle most of them make some improvement. The hospital is in the outskirts of the city with ample grounds. The cost of maintenance has been $1.25 per day. Between 8 July, 1897, and 30 August, 1899, there had been 301 persons admitted.[2] At present (February, 1900,) Dr. Lyle states that there are about sixty patients and the expenses are from $1 to $1.10 per day per patient.

[1] New York, Chapter 637 of 1899.

[2] Ohio, Sanitary Bulletin, September, 1899.

Cook County, Ill., has recently built a hospital for indigent consumptives which accommodates 300 persons and is at present (February, 1900,) well filled.

Leprosy.

There are a considerable number of lepers in the United States, though it is not known with accuracy how many. They are found in considerable numbers in California, Iowa, Louisiana, Minnesota, Wisconsin, and are scattered about other parts of the country. California, Connecticut, Iowa, Maine, North Carolina, New Jersey, and Pennsylvania have laws which require the report of these cases to the local health department, but they are not enforced. The United States marine hospital service is at present investigating the prevalence of the disease and it will doubtless soon be known approximately how many lepers there are in the country. The subject has received renewed attention since the acquisition of Hawaii where there are a large number of lepers.

California[1] has a stringent law forbidding the landing of persons afflicted with leprosy or elephantiasis. The commissioner of immigration is to inspect all vessels bringing Asiatic immigrants and the ship is taxed seventy cents per passenger to pay for the inspection and the care of the infected persons that are found.

Louisiana[2] provides that lepers shall be confined and the duty of commitment is given to the judges. No one is to harbor a leper. No attempt has been made to enforce this law, but a leper home has been provided by the state at which dwell about forty of the 200 lepers. The hospital is one of the old state quarantine stations, and the patients are cared for by Sisters of Charity.[3] Philadelphia also has a leper hospital with four beds, and in New York City lepers have been confined on North Brother Island, to which all the major communicable diseases are taken.

Venereal Diseases.

Accurate statistics in regard to the prevalence of venereal diseases are entirely lacking in the United States, but no one doubts that they are exceedingly prevalent. Syphilis has always been considered a serious disease, and recent pathology seems to teach that gonorrhœa is nearly as bad and much more common. These diseases would certainly warrant the attention of the health officer if it were not that public sen-

[1] California, Penal Code (1886), Secs. 2952–68.

[2] Louisiana, Chapter 85 of 1892.

[3] Reports and Papers American Public Health Association, Vol. XXV., p. 285.

timent is strongly averse to free discussion of the subject or to any official recognition of the conditions which give rise to the diseases.

A letter addressed last year by Dr. Isadore Dyer of New Orleans[1] to the officials of every city of 20,000 inhabitants in the United States brought out the fact that no official effort is anywhere made to restrict these diseases. According to the paper referred to there are nine cities which attempt by licenses or fines to restrict the number of houses of prostitution, and three cities confine such houses to a particular district. There is no city which attempts by a medical inspection of prostitutes to limit their opportunity for spreading diseases. San Francisco, San Antonio, and St. Louis have attempted to do this, but only for a short time, as public sentiment was strongly opposed to such municipal action. In St. Louis the act was in force from 1870 to 1874, and the amount received from license fees was used to establish a hospital for venereal diseases in women, but the hospital is now used for all diseases of women. In San Antonio in 1889 houses of prostitution were licensed with a fee of $500. The city physician examined each prostitute weekly, and if free from disease gave her a certificate and sent a duplicate certificate to the city clerk. During the ten months that the law was in operation 2886 examinations were made of 230 women, and forty-two cases of venereal disease were discovered. The ordinances of Denver[2] provide that the health commissioner may inspect prostitutes and isolate those who are infected, but this is not done.

In Massachusetts[3] if a case of venereal disease is found in any public institution it may be isolated if necessary, and may be kept in isolation even after the time of discharge. In Ohio[4] the cost of caring for diseased prostitutes may be charged to the house.

A law recently passed in Michigan[5] provides that persons afflicted with syphilis or gonorrhœa shall be incapable of contracting marriage.

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[1] New Orleans, Medical and Surgical Journal, December, 1899.

[2] Denver, Ordinance No. 44 of 1893, Sec. 153.

[3] Massachusetts, Chapter 420 of 1891.

[4] Ohio, Annotated Statutes (1900), Sec. 2126.

[5] Michigan, Chapter 247 of 1899.

CHAPTER XI.

COMMUNICABLE DISEASES

(CONTINUED).

Disinfection, Laboratory Work, Vaccination, Antitoxin.

PROBABLY no one will deny the advisability of disinfecting after the communicable diseases, though in the opinion of the writer the danger from goods or rooms exposed to infection has been considerably exaggerated. Disinfection of infected things has been attempted from the earliest times and the practice is more general now than ever before. Owing to our better knowledge of the nature of the disease poisons, or at least some of them, and of the action of disinfectants upon them, modern methods are much more efficient than those formerly employed. Disinfection may be practiced during the course of a disease for there are always certain things, as bed linen and clothing, which must be from time to time removed from the sick room. Disinfection of this kind is described in the various circulars, examples of which are elsewhere given, and is of course to be carried out by the family. Sometimes, as in Providence and the District of Columbia, disinfectants for such purpose are furnished by the health department. Disinfection of the infected premises including goods, after the patient is well, is usually done by the sanitary officials and it is this disinfection which is here considered.

Disinfection is made compulsory by the laws of several states.[1] Many cities outside of these states require disinfection by their local regulations. Even in cities where there are no such regulations, as in Providence, the District of Columbia, and St. Paul, disinfection is nevertheless done by the health department in nearly every case. In several states, as in Massachusetts, it is required that the disinfection

[1] Colorado, Indiana, Iowa, Maryland, Massachusetts, Mississippi, Michigan, North Dakota, North Carolina, Ohio, Pennsylvania, South Dakota, Wisconsin, Utah and Vermont; in Minnesota and New Jersey the local boards of health are authorized to disinfect.

shall be to the satisfaction of the board of health. The Massachusetts statute is a good example of this class of laws.[1]

Ohio, Pennsylvania, and Wisconsin also require that the owner or householder shall disinfect, but in all of these states wherever there are active sanitary officials, the work is done by them, as it is sure to be done much better than when left to the householder, even if it is done under the direction of the board of health as is required in Iowa, North Carolina, Pennsylvania, North Dakota, South Dakota, and Vermont. In North Carolina the disinfection is to be paid for by the householder if he is able. In St. Paul no charge is made for sulphur fumigation, but if formaldehyde is used a charge of fifty cents a pound is made.

In North Dakota the law takes the form of a prohibition to "let or hire any house, or room in a house, or building where any of these diseases have been, until the same has been thoroughly disinfected." Similar rules are found in Bridgeport, Buffalo, Macon, Ga., and Salt Lake City. In order to make certain that disinfection has been properly performed, the North Dakota law and also that of Maryland and Vermont, require that a certificate to that effect shall be given by the health officer.

In Minnesota and New Jersey the board of health is authorized to destroy goods as well as to disinfect them, and in both states the goods so destroyed must be paid for. Even if this is not so provided by statute it is probable that the courts would award damages as was done under such conditions in Detroit.[2] In New Jersey the board of health must make an inventory of the goods destroyed and immediately certify their value to the municipal authorities who shall pay the sum certified to the owners. Nevertheless, in most cities it is not the general practice to pay for damages inflicted by disinfection. In North Carolina the statute requires the disinfection to be in accordance with the regulations of the state board of health, and in Indiana and Mississippi the state board of health regulations which require disinfection specify how it shall be done. Quite full specifications are given by the state board of health rules of each of these states.

Methods of Disinfection.

In 1895 the writer prepared a paper on methods of disinfection in vogue in fifty-five of the principal cities of the United States. At that time fifty-one of these cities relied on the use of sulphur dioxide and

[1] Massachusetts, Chapter 272 of 1890:

"... and upon the death, recovery, or removal of such person, such of the rooms of said house and such of the articles therein as in the opinion of the board of health have been subjected to infection or contagion shall be disinfected by such householder to the satisfaction of said board of health."

[2] Stafford vs. Board of Health of Detroit, 8 July, 1899.

only twelve had appliances for steam disinfection. At the present time sulphur has been almost entirely superseded by formaldehyde and there has been a considerable increase in the number of steam appliances.

There is no doubt that more active measures are taken to disinfect after smallpox, yellow fever, and diseases that appeal to the popular imagination, than after scarlet fever, diphtheria, measles, and phthisis, for the public will submit to and even demand much more in the former than they will in the latter. In smallpox it is customary to burn many articles of little value, as old clothes, carpets, cheap mattresses, toys, etc. If steaming facilities are available, probably most things that can be steamed are so treated, and often the woodwork and furniture are washed with a liquid disinfectant, by or under the direct supervision of the sanitary officials. Furthermore, the rooms are usually fumigated with sulphur dioxide or treated with formaldehyde. Probably ninety-nine per cent. of public disinfection is done for scarlet fever, diphtheria, measles, and phthisis and other common diseases, and most of it for scarlet fever and diphtheria. It is the routine practice in these common diseases which will now be considered. There are three methods employed for disinfection after communicable disease. One consists in the application of gaseous disinfectants to the apartment, another consists in subjecting movable articles to the action of steam, and the third consists in washing woodwork, walls, and furniture with a liquid disinfectant.

Sulphur Dioxide. In 1895 nearly all cities in the United States relied on sulphur dioxid for disinfecting, only four out of fifty-five cities making use of chlorine gas. The experiments conducted by Sternberg and Raymond under the auspices of the American Public Health Association[1] showed that sulphur fumigations are of considerable value in the destruction of the virus of vaccinia, and presumably that of smallpox, and also of the known non-spore-forming bacteria. In the absence of anything better, health officers generally persisted in the use of this disinfectant, although it was known to have almost no penetrating power and was not entirely successful for surfaces even under the most favorable conditions, conditions which could not generally be secured. It was shown that a certain amount of moisture was desirable when this substance was used, and as a result of the recommendations of the above mentioned report there was generally adopted the method of placing a vessel of burning sulphur in a pan of water. In Providence the outfit consisted of an iron pot which was placed in a dishpan containing about two inches of water. The pan stood upon a wire sup-

[1] Disinfection and Disinfectants, Report of Committee of American Public Health Association, 1888.

port such as is used to stand flatirons on. Sets of this apparatus were carried about in a wagon and placed in the rooms to be disinfected. About three or four pounds of roll brimstone were used for every 1,000 cubic feet of space to be disinfected. An ounce or two of alcohol was poured on the sulphur and set on fire with a match, and the room closed by pasting up the door with strips of paper. Occasionally the windows were pasted if very loose. If the room was to be used the same day, the disinfector generally called to open it as he was used to the action of the gas. The room was usually closed five to eight hours, and if it was left over night, the gas was found to have pretty nearly escaped before morning.

At one time the so-called sulphur candles were largely sold for domestic disinfection by the householder. These are convenient to carry and light but are not as cheap as roll brimstone, and have rarely been used by health officers, though they have been in Atlanta and New Orleans even within the last few years. Liquid sulphur dioxide condensed in tins, was at one time sold by Elmer & Amend of New York, but there was not much demand for it. With the introduction of formaldehyde, sulphur has generally dropped out of use, though it is sometimes used in smallpox, and is employed quite generally in a few cities. In Cincinnati it is used considerably, especially in smallpox, and in 1898 it was used some in Philadelphia, New Orleans, St. Paul, Seattle, Erie, and doubtless many smaller places, and in Atlanta it was used in houses that were so open that formaldehyde would escape too rapidly. In Montclair, N. J., in 1897, formaldehyde was tried and given up as valueless, and sulphur was again used. Since then (1899) sulphur has been again abandoned.

In Denver also sulphur has been used recently and tested on diphtheria bacilli and under some conditions gave better results than formaldehyde.[1] On the other hand in tests made by the state board of health of Iowa it failed completely.[2]

Formaldehyde. The use of this gas was brought to the attention of health officers in 1895-6 and rapidly sprang into general favor. Two claims were made for it; that it had great penetrating power and would not injure any articles with which it was liable to be brought in contact. Both of these claims have been substantiated, but the very quality which makes it valuable, its diffusibility by virtue of which it will penetrate fabrics, renders it very difficult to confine in an ordinary house, and greatly interferes with its successful use. It is probably the diffi-

[1] Denver, Report of Bureau of Health (1897-8), p. 101.

[2] Iowa, Tenth Biennial Report of State Board of Health (1898), p. 249.

culty of confining it which has given less success in actual practice than in laboratory experiments. Nevertheless it is, as ordinarily used, probably much better than sulphur, and its introduction marks a step in advance in the art of disinfection. Various methods have been designed for using this substance, and all sorts of devices are found.

Of as much importance as the method of generating the gas is the securing of the room so that the gas will not escape. In most cities some attempt is made to make the room tight by pasting over or stuffing all openings. The faithfulness with which this is done is an important factor in the success of the disinfection. Doors and windows, ventilators, and chimney openings should of course be pasted, but besides these there are in poorly built houses many openings through which the gas may escape. One of the most convenient methods of pasting over openings is by the use of gummed paper which was introduced by the board of health of Boston. This should be two inches wide and may

FIG. 18.
Method of applying gummed paper in Providence.

be ordered in rolls of any size, and costs about twenty-five cents a pound. All that needs to be done is to moisten it with a sponge, tear it off the roll and apply to the openings. In Providence the inspector carries the paper in a roll in the basket with his other apparatus and uses it as shown in Fig. 18. In Montclair, N. J., surgeons' adhesive plaster is used for this purpose.

It is the purpose of the various methods of generating the gas to get as large a quantity into the room in as short a time as possible. It is done in various ways; it may be generated from wood alcohol, it may be driven off by heat from its solution in formalin or formol, it

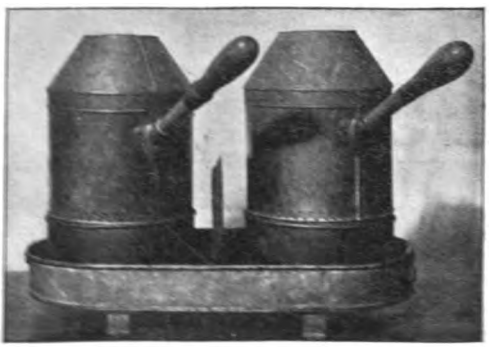


FIG. 19.

Ward's Formaldehyde Generator.

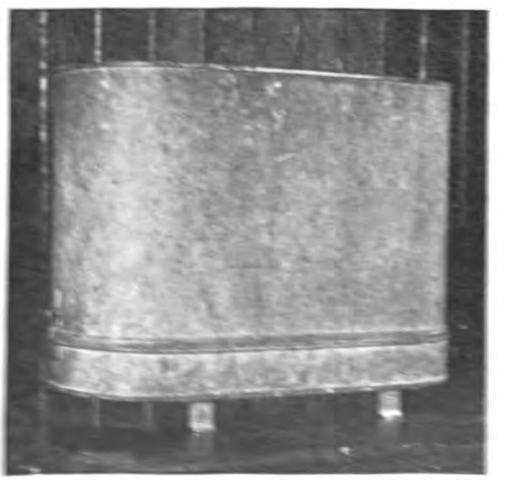


FIG. 20.

Ward's Formaldehyde Generator ready for transportation.

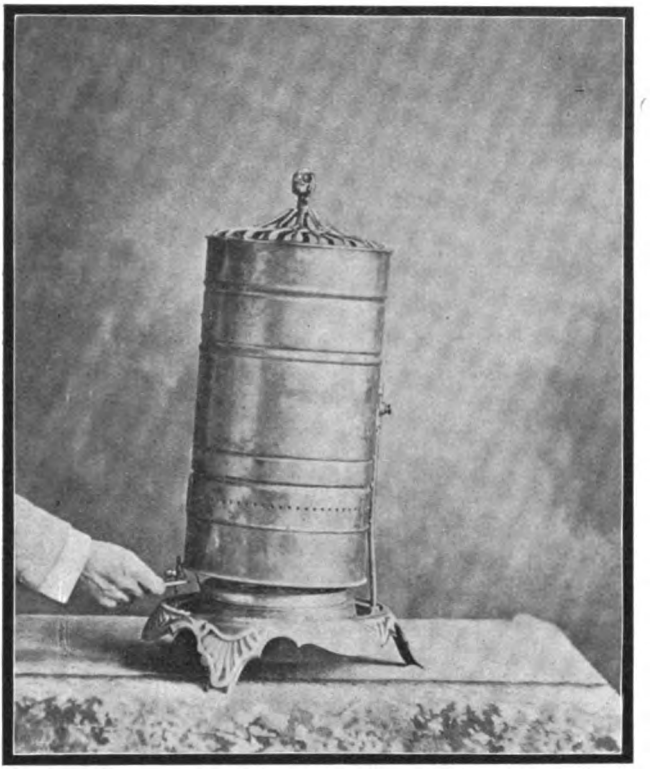
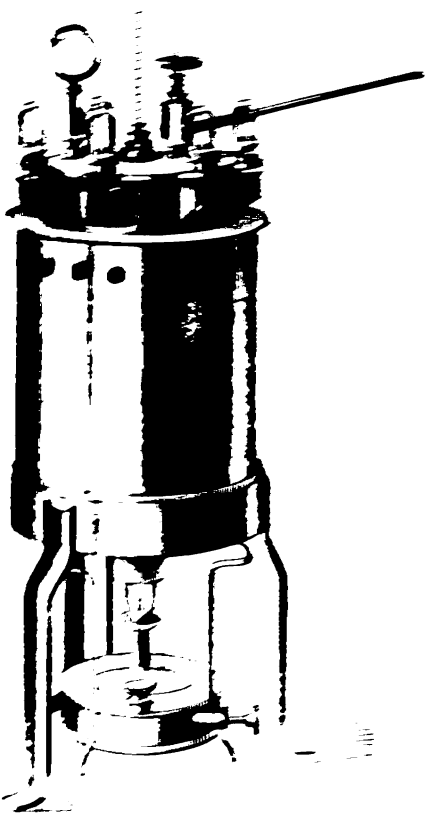


FIG. 21.

The Kuhn Formaldehyde Generator.

may be generated from the solid paraformaldehyde, or formalin may be used as a spray, and the gas allowed to escape from the small droplets of fluid.

First. Generation from wood alcohol. This was the method first employed, and was then thought to be the most economical. Platinum, or asbestos treated with platinum salts, have the property if slightly heated of decomposing the vapor of methyl alcohol and producing formaldehyde. Various forms of apparatus have been devised for this purpose, but it is not now generally thought that they produce as good or as economical results as may be secured by other methods. These generators are used in Cambridge, Minneapolis, Lynn, and Newton. Those used in Newton and Cambridge and shown in Figs. 19 and 20, are made by W. A. Ward, 5 Harvard Street, Brookline, and cost $20 each. Another device of this kind shown in Fig. 21 has recently been put on the market by the Kuhn Formaldehyde Generator Co. of Washington, D. C. It has been tested by the officers of the marine hospital



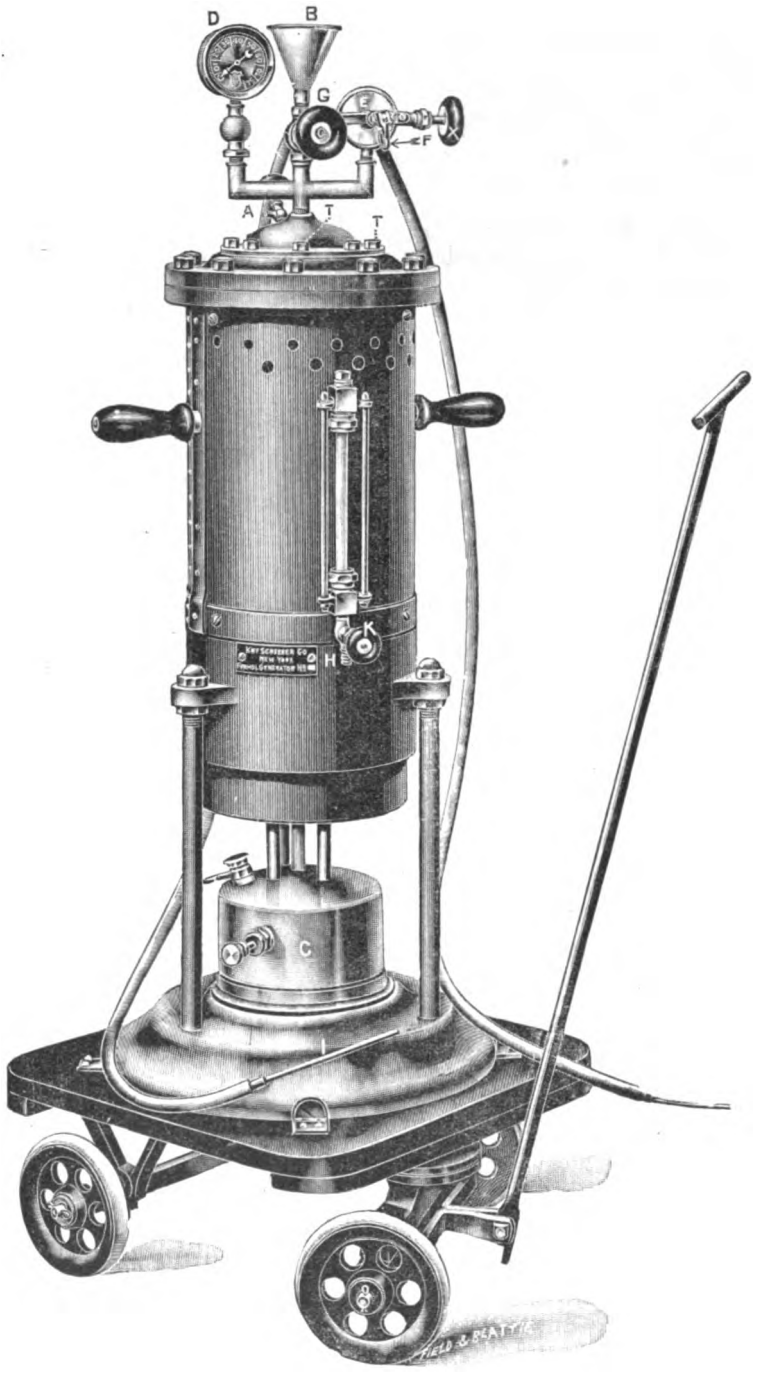


FIG. 23.

Kny-Scheerer Formalin Generator

tain of paraformaldehyde which for use in a spray diminishes its value. The term formochloral is applied to formalin to which has been added twenty per cent. of calcium chloride. The addition of the chloride is to prevent the polymerization of the formaldehyde by heat, i. e., its transformation into comparatively inert substances. Ten per cent. of glycerine is sometimes added with the same object in view. Formalin, when heated under pressure, rapidly gives off formaldehyde gas. Several forms of apparatus have been put upon the market. One made by the Sanitary Construction Company heated the liquid in a coil into which it slowly flowed from the reservoir. H. K. Mulford & Co., of Philadelphia, afterward took their business and sold many of these which are still in use, but this firm has now substituted a simpler arrangement. The Trillat autoclave (Fig. 22), sold by Fries Brothers of New York, operates on the pressure principle. It is used in Atlanta, Fall River, Macon, Ga., Nashville, New Orleans, Pittsburgh, Savannah, and to some extent in Milwaukee and Philadelphia. It costs $100 and is shown in the figure. A somewhat similar apparatus is made by the Kny-Scheerer Co. of New York, and is sold for $60. It has been used in the District of Columbia, San Francisco, New Orleans, and Buffalo. See Fig. 23.

The object of heating the liquid under pressure is to prevent polymerization or the production of the solid paraformaldehyde or "paraform" instead of the diffusible gas: but the experiments of Novy showed that it was just as well and even better to carry on the evaporation in a vessel with a freer opening and under atmospheric pressure. The gas is thus rapidly disengaged, and if any paraform is left behind after the evaporation of the water it too is speedily returned to gas again. H. K. Mulford & Company now have this apparatus on the market, using their kerosene burner to heat the liquid. The price for this is $25, the same as that for their old apparatus, and it does not annoy the disinfector by frequent clogging, such as occurred in the coil. It is shown in Figs. 24 and 25.

Either this or Mulford's coil generator is used in Baltimore, Boston, Cincinnati, Fitchburg, Louisville, Newark, Pittsburgh, and St. Paul.

Another form of this apparatus (Fig. 26) is made by Charles Lenz & Sons of Philadelphia, and another still by Parke, Davis & Company of Detroit. The cost of the former is $12.50.

In using all these forms of apparatus it has in the experience of the writer been found convenient to use a larger outlet tube than will go through a keyhole. Moreover, many doors have no keyhole, so that in Providence the disinfector carries a locksmith's screwdriver and takes off the knob and inserts the tube through the opening through the latch.

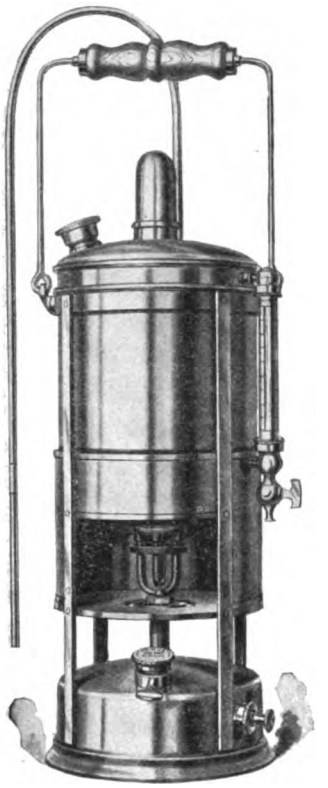


FIG. 24.

Mulford's Formaldehyde Generator.

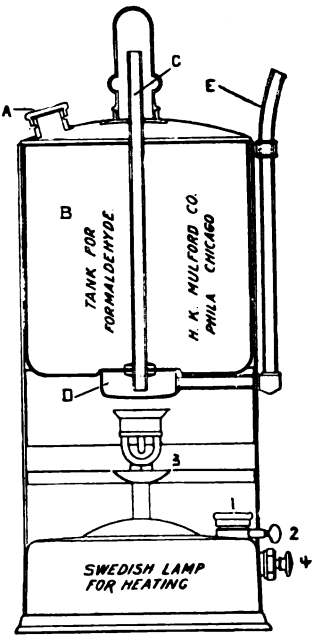


FIG. 25.

Diagram showing construction of Mulford's Generator.

MECHANICAL OPERATION — A quantity of solution of Formaldehyde is put into the receiver B through the opening A; the heating lamp is lighted, and the chamber D brought to a red heat. The solution of Formaldehyde in receiver B is vaporized, rises to the top of the dome C, passes down the pipe to the heating chamber D, where the gas is not only superheated but also thoroughly-dried, and passes through the pipe E.

In many of the Maine towns the gas is generated by soaking a large roll of sheet asbestos in formalin and placing it upon the top of an oil stove in the room to be disinfected.

The amount of formalin used varies in different cities, but the makers usually recommend from six to ten ounces per 1,000 cubic feet of space to be disinfected, and this is the amount usually employed. In Boston, however, the routine practice is twenty ounces for the same space, and in Pittsburgh, four pounds. As in the latter city test cultures are placed in every room and failures to kill them are not infrequent, the results are not reassuring to those places that rely on ten ounces.

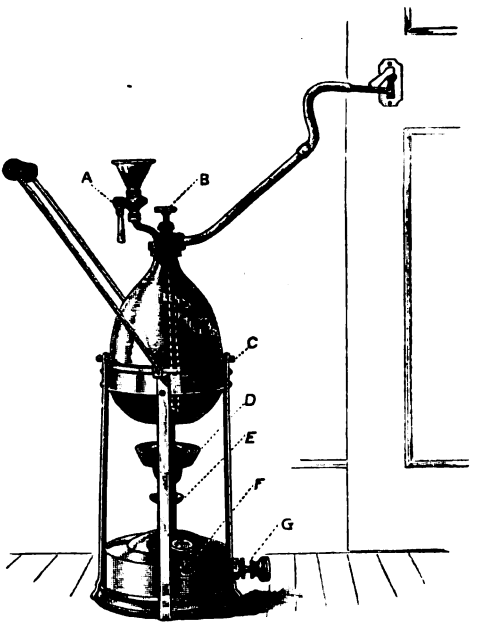


FIG. 26.

The Lentz Formaldehyde Generator.

Third. From a saturated watery solution of formaldehyde is deposited a white solid called paraform or paraformaldehyde, this by drying becomes a powder known as trioxymethelene. Both of these are polymeres of formaldehyde and are both probably found in the commercial paraform. The solid is itself inert, but even at room temperature slowly gives off formaldehyde. When heated it is rapidly changed into the gas, and in this manner large quantities can be evolved in a short time.

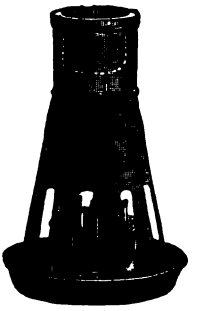


FIG. 27.

Schering and Glatz's Paraform Lamp.

Schering and Glatz have prepared this paraform in pastilles containing one gram each, which are sold in tin boxes of 500 at $3.50 per box. Crude paraform in bulk is also sold by Fries Bros., of New York, at ninety cents a "cake." Schering has a lamp for heating the pastiles, as shown in Fig. 27. This is sold for $3, and has been used to some extent in Baltimore, and Providence, and is now used in Montclair, N. J., Memphis, Trenton, Raleigh, Elizabeth, N. J., and Charleston. It however appears to be a very expensive way of generating the gas, and it has been said that if overheated the pastilles sometimes

take fire. It is also considered somewhat dangerous to leave a fire or lamp of any kind burning in a closed room. In fact to escape a possible danger from fire was one of the reasons why health officers were glad to give up sulphur fumigations. The E. D. Taylor Company of New Brunswick, N. J., furnish a candle made of parafine and paraformaldehyde which is said to be efficient and easy to use.[1]

Fourth. If a liquid disinfectant of sufficient strength is sent in a fine spray over a room and its contents, everything touched by the spray is sure to be disinfected. This method has been used a great deal in Paris, but not very much in this country. In New Haven and Providence a common garden spray has besn used for disinfecting after smallpox, and this method has been employed in outbreaks at the south by the marine hospital service. In New York a spray was tried and abandoned, but in Philadelphia it was used for a number of years and was still in use in 1898. The apparatus cost $100 (243 francs in Paris) and was very heavy, requiring two men to lift it. It was made by Geneste Herscher & Company of Paris. At first a solution of bichloride of mercury was used, but later formalin diluted so as to contain about two per cent. of formaldehyde, about two quarts of this being used for a room. By using formalin it was expected that not only would the things actually touched by the liquid be disinfected, but that hidden surfaces would be disinfected by the gas. The health department of Chicago has devised a different method of using the formalin spray which is designed simply as a means of freeing the gas. The process is described as follows:

"Seal up all cracks around windows and doors and other places where there is a possibility for the gas to escape. Hang up large double sheets across the infected rooms on a clothesline. The sheets should be hung by their edges so as not to be double. On these sheets by means of the sprinkling apparatus (see cut) apply the formaldehyde forty per cent., evenly all over the sheets, distributing it as much as possible. One sheet should be used for every 1,000 cubic feet, and the quantity necessary for every 1,000 cubic feet is about five ounces or 150 c. c. Seal the door of exit immediately and allow the formaldehyde, to evaporate spontaneously. Leave the rooms thus fixed for at least five hours or longer if possible. Then remove the sheets and allow to air. All bedding or soiled clothing should be hung up on lines or placed over chairs so as to allow the gas to come to every part of it. All bureaus, etc., should be opened. Books are set on end and opened."

This method has been used to some extent in Providence (as indeed have most other methods of formaldehyde disinfection), but it is cus-

[1] Buffalo, Monthly Report of the Department of Health, December, 1900.

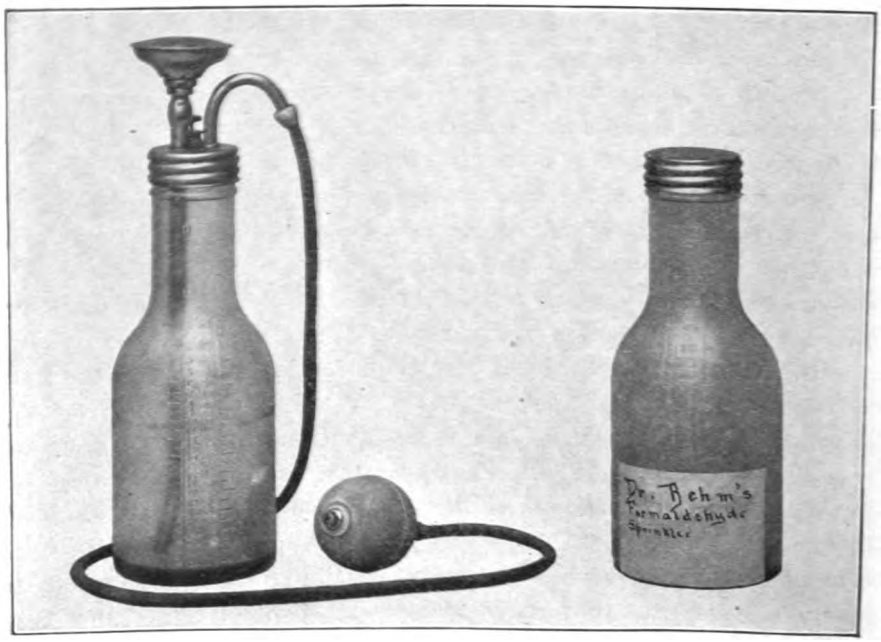


FIG. 28.

Behm's Spray Apparatus (Chicago Method). From Bracken's *Disinfection and Disinfectants.*

tomary there to spray the carpets, mattresses, and sometimes the walls of the room as well, so as to get the direct action of the liquid besides that of the gas. This method was also used in Bridgeport, Conn., Concord, and Detroit. In the District of Columbia where the appropriation has not been sufficient for the district officials to disinfect every infected house, the householder has been directed to use sheets after the Chicago method. In Asbury Park a twenty per cent. solution of formalin is sprinkled about the room and on suspended sheets by means of a watering-pot, about one quart of the liquid being used for each 1,000 cubic feet of space. It is generally believed that all the disinfection that is accomplished with formaldehyde occurs during the first few hours of exposure. Usually rooms are not closed for more than five or six hours and are opened by the householder, as the gas that remains is not at all dangerous, though even after airing, enough gas remains in the room for some days to be quite annoying. This could readily be gotten rid of by the use of ammonia gas, but this is rarely resorted to by health officers.

Steam Disinfection. Textile fabrics, mattresses, pillows, carpets, woolen clothing, etc., can, if infected, only be thoroughly disinfected by

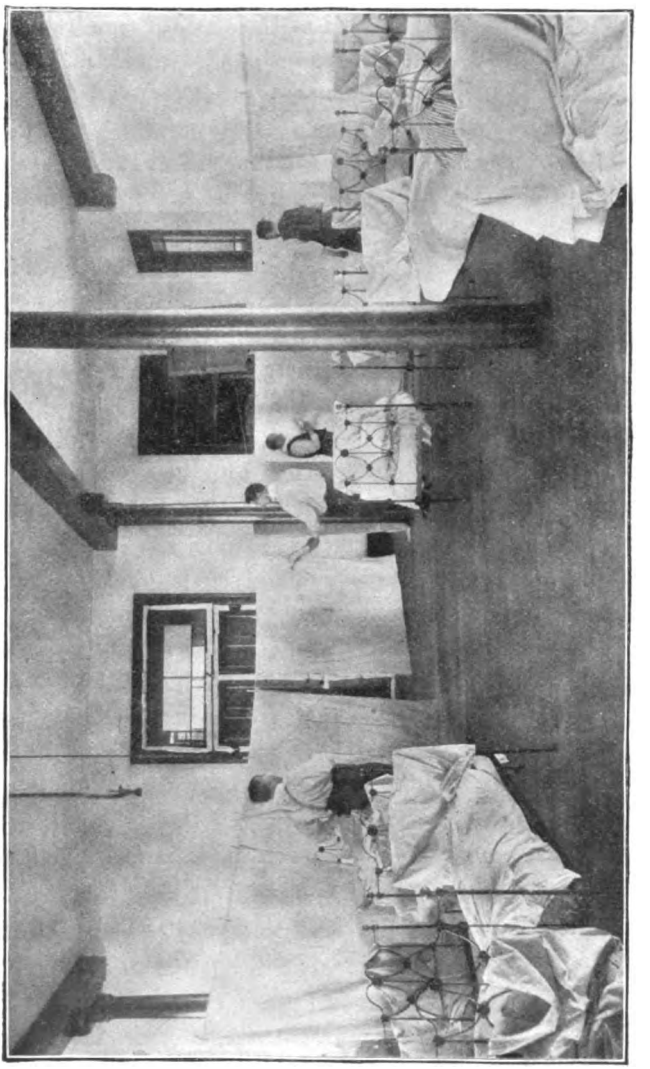


FIG. 20.

Chicago method of using Formalin on sheets. From Bracken's *Disinfection and Disinfectants.*

[illegible] may if they [illegible] that this is [illegible] have how- [illegible] and have pro- [illegible] steam disinfecting [illegible] time he has been [illegible] Boston, the [illegible] New Haven. [illegible]

[illegible] chamber insu- [illegible] Philadelphia [illegible] is somewhat [illegible] square section are some- [illegible] according to the [illegible] diameter varies from 5 to [illegible] The apparatus in Boston is [illegible] in Providence, 6 by 14 feet, [illegible] Mass., 7 by 7 feet. Some [illegible] chambers are jacketed [illegible] walls between which [illegible] In Philadelphia, Boston, Milwaukee, and New Haven the steam chest is not jacketed and in Boston and the District of Columbia a sheet metal shield is suspended near the top to keep the drip of condensation from the goods, and between the shield and the shell is a coil of steam pipe which also tends to prevent condensation. The jacket is a very great advantage, as by keeping a higher pressure in the jacket than is maintained in the chamber, all condensation and dripping in the latter is prevented, except on the door which cannot be jacketed. In all cases the apparatus should be covered with asbestos magnesia, felt or other heat insulating material. Some of the disinfectors are provided with a vacuum apparatus. This too, is an advantage though not essential. Sometimes a pump may be used for this purpose which is usually operated by steam, as in Brooklyn and New Haven. Sometimes ejectors are used for this purpose, working either with steam or water; they cost much less than pumps but are not so economical in operation. Ejectors are used in Providence and Paterson. If the air is exhausted before the steam is turned on, the penetration of the goods takes place quicker, and if after disinfection the steam is exhausted before the door is opened, there is less moisture condensed when the cold air strikes the goods. There are various ways of fastening the door. Sometimes a wheel and screw in the center of the door are used to force out radial wedges and so close it as at the Boston City Hospital, and sometimes there are a series of cams with

handles, around the rim, which force the door down on the packing. These are convenient methods but do not make as tight a joint as can be secured with hinged bolts and nuts. Sometimes each nut has a handle by which it can be screwed down, as in Brooklyn and Boston, but usually a ratchet wrench is used which probably is about as good a method as any. The door may be hung by a hinge which is the most common way, in which case the bottom should be supported by a roller to prevent sagging. Sometimes it is preferable to have the door detachable and supported by a turn buckle from an overhead trolley or a crane as is shown in the illustration of the District of Columbia disinfector.

Some of the disinfecting chambers are built with a door at each end and are set in a partition separating two rooms, one of which is used for receiving and the other for delivering goods as in Boston, Philadelphia, and the District of Columbia. In this way, if different men are employed for collecting and delivering and for loading and unloading the disinfector, there can be no possible chance for reinfection of the goods; but the writer after ten years' experience with a single door disinfector, has never seen anything to suggest that any other arrangement is necessary. The disinfecting chamber is supplied with rails and a car for convenience in loading and unloading, and often with various sorts of racks or cages for separating the goods.

The car and racks are often made of metal and sometimes iron, in which case they may be covered with canvas to keep rust from the goods. In Providence the cars and racks are made of whitewood which is free from resin and lasts for years if the disinfector is used properly; but if the disinfector is used so that the wood is exposed to moist steam, the racks will soon be warped out of shape.

The apparatus should be supplied with a safety valve and steam gauges for showing the pressure and vacuum, and sometimes an electric thermometer is used to indicate when the interior of the goods has been brought to a proper temperature. In Pittsburgh with each treatment of goods a self registering thermometer is put in the steam chamber. This is enclosed in the center of a six-inch roll of cotton which is enclosed in a wire basket and locked by the bacteriologist.

The following description and figures illustrate the very complete disinfecting plant in the District of Columbia:[1]

"The building containing the machinery is 70 feet long by 32 feet wide, timber-framing, covered with corrugated galvanized iron sides and roof, hip rafters 12 feet clear to the bottom of truss, granolithic floor with a pit 13 feet 6 inches wide, 26 feet 6 inches long, and 14 inches deep for the sterilizing chamber.

[1] District of Columbia, Report of Health Officer (1896), p. 221.

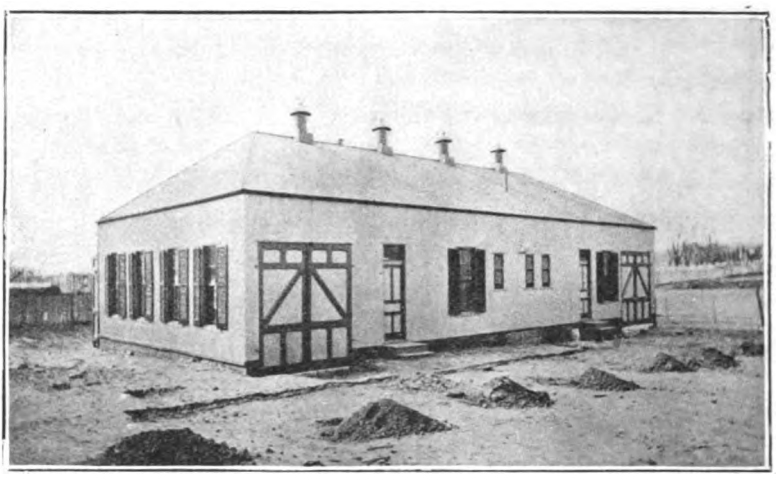


FIG. 30.

Disinfection Building, District of Columbia. From Report of Health Officer, 1896.

"At each end driveways for vans are provided 10 feet wide, and a frame partition divides the building into two apartments, for infected and disinfected articles. Provision is also made for dressing rooms, bath, and closets, accessible from each apartment.

"The apparatus consists of a chamber for steam disinfection, boiler and necessary appurtenances, chamber for sulphur or other fumigation, vats for bichloride or other liquid disinfection, and sprays for disinfection of the vans. The steam chamber is 4 feet 4 inches wide, 5 feet 4 inches high, and 9 feet long, and is made rectangular to give the most effective space during exposure, with the greatest economy of steam, and is constructed of an inner and an outer steel shell, forming steam jacket, with cast-iron end frames, intermediate truss bands, and screw-stay construction.

"The doors are arranged at both ends, having concave steel plates riveted to cast iron frames, fitted with steam-tight gaskets, and are handled by convenient cranes, being drawn tight by steel eyebolts, swinging in and out of slots in the frames.

"The system of piping is so arranged as to give thorough control of the circulation. Steam may not only be admitted at top and bottom at will, but may also be admitted at either end on top and discharged at opposite end on bottom, or vice versa, so that cross currents are obtained and the steam handled in any manner suited to obtain the best results from the articles being exposed.

"In this system of piping a patent air exhauster is attached to obtain a partial vacuum in chamber, thus preventing a possibility of life to the germ and securing greater penetration to the steam.

"Thermometers, to indicate the temperature, are attached to each door, and gauges are provided to indicate both vacuum and steam pressure and a safety valve is introduced to prevent a possibility of overpressure in the chamber, the amount of working pressure being regulated by a reducing valve in the steam pipe from the boiler.

"For convenience in handling the goods, two cars are provided, of light iron construction, with three removable trays in each, covered with galvanized screens, and on the top three rows of bronze wardrobe hooks are arranged, so that articles may be laid upon the trays or the trays removed and clothing hung upon the hooks.

The chamber is placed in a pit 14 inches deep, to bring the track in the chamber on a level with the floor, and in this pit are two transfer tables, so that the cars passing in at one end of the chamber, after being unloaded at the other, can be returned to the working end of chamber by means of the transfer tables and side tracks, thus securing a continuous operation and a complete isolation of the infected from the disinfected end of the building.

"The steam chamber and boiler and all steam pipes are covered with magnesia non-conducting covering to prevent radiation and loss.

"The working of such a sterilizing chamber may be described as follows:

"The steam, generated at high pressure in the boiler, is reduced to a proper pressure by a reducing valve and allowed to circulate continuously in the jacket, slowly at first to avoid sudden expansions.

"While the chamber is being slowly heated the goods are loaded upon one of the cars and then pushed into the chamber and the doors closed and made steam and air tight. When the thermometer indicates proper temperature in the inner chamber the air exhauster is started, until a vacuum of 10 to 15 inches is shown on the gauge; then it is stopped and steam is admitted slowly to the inner chamber until there is a pressure of, say 10 pounds. The valves from the jacket are then closed, while the vents are opened so as to allow the steam to escape.

"The air exhauster is again started and the above process repeated; then the steam is allowed to circulate through the inner chamber under 5 or 10 pounds pressure, so as to secure a full and perfect exposure of all the articles to the current of steam. After the period of exposure the steam is closed from the inner chamber and the vacuum again started, to remove any condensation which may occur. After the ex-

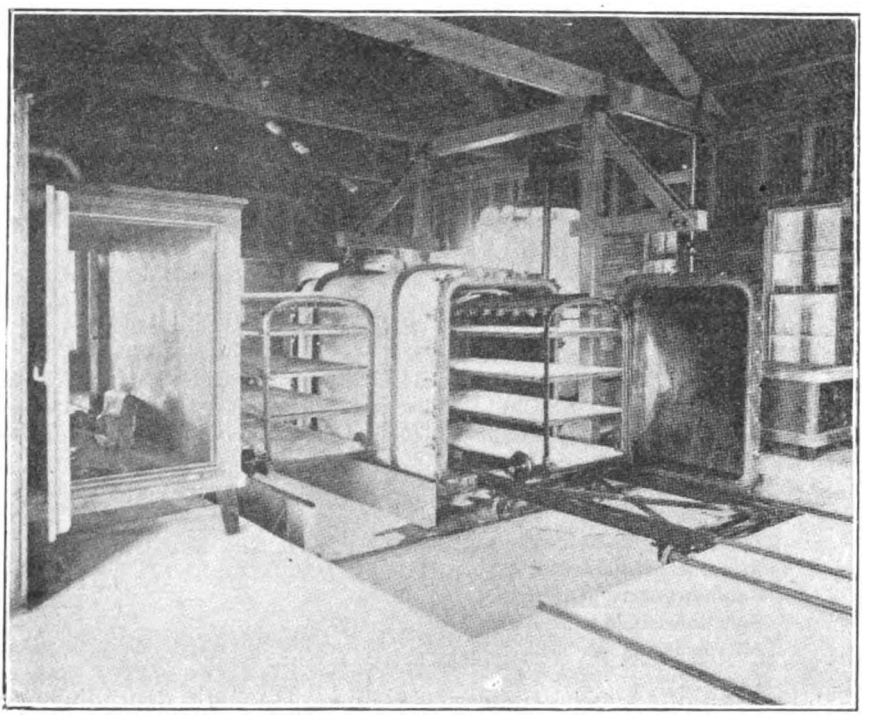


FIG. 31.

Interior of Disinfection Building, District of Columbia. From Report of Health Officer, 1896.

[illegible] the door at the opposite end of chamber is opened, the car removed and replaced, and chamber closed at the working end of chamber by means of the transfer valves.

"The system employing [illegible] is [illegible] the steam [illegible] the [illegible] will be sufficient to [illegible] the [illegible]. [illegible] the [illegible] the [illegible] and the [illegible] are now washed with [illegible].

"A [illegible] made up of apparatus as it is used in the Marine Hospital Service [illegible] with [illegible] manner [illegible] arranging articles like leather that [illegible] subject [illegible].

In Boston in 1899 a [illegible] was built at the Kingston Street [illegible]. It is [illegible] and [illegible] [illegible] [illegible]

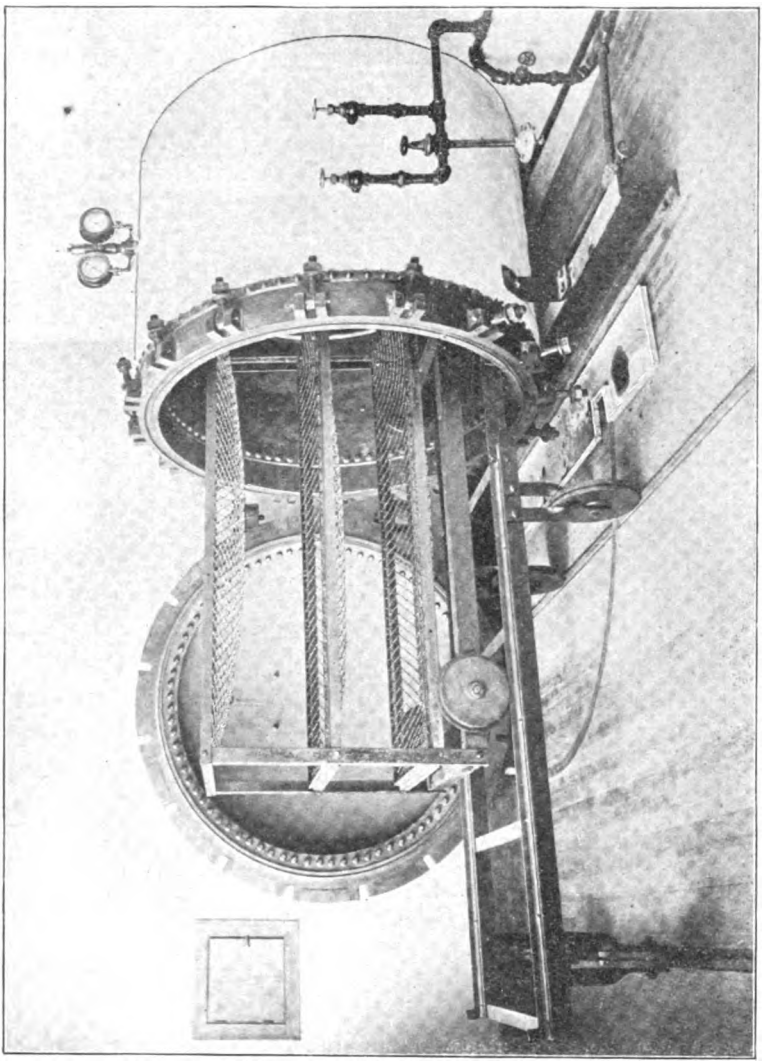


FIG. 32.

Worcester Steam Disinfecting Chamber. From plate loaned by the Stewart Boiler Works of Worcester.

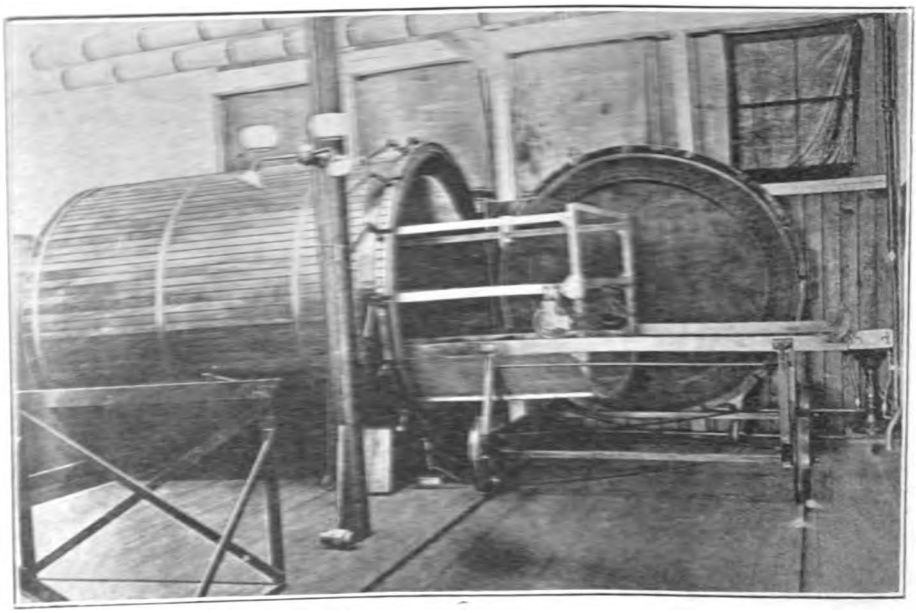


FIG. 32.

Boston Steam Disinfecting Chamber. From Report of Boston Board of Health, 1892.

quired. A steam chest of ample size for a city of 150,000 inhabitants and fitted with everything necessary for first-class work ought to be purchased for $1,000. The Paterson chamber cost $815.

In 1895 a portable steam disinfector was built in Milwaukee at a cost of $1,500. Its weight was 8,220 pounds, and it was three and one half by nine feet inside measurement. Chicago also built a similar van which can be seen in the accompanying illustration. This van is now kept at the hospital and is used as a stationary disinfector, but it is not often put in service. It is at present believed that a stationary plant is much to be preferred to one that is portable. The latter is expensive to construct and more expensive to operate, and in any event can hardly be made large enough.

It is generally believed that the application of a strong disinfectant solution to floors, wood-work, and furniture is an excellent way to disinfect them. Washing such things and indeed washing everything that can be washed is usually recommended in disinfection circulars. After cases of communicable disease the family are by circular or otherwise, usually advised to wash with disinfectants all solid surfaces. Carbolic acid to two per cent. solution or corrosive sublimate one to one thousand are recommended. Sometimes these disinfectants are given to the family by the health department. In Providence the disinfector usually leaves at the house several paper pill boxes containing three drams of

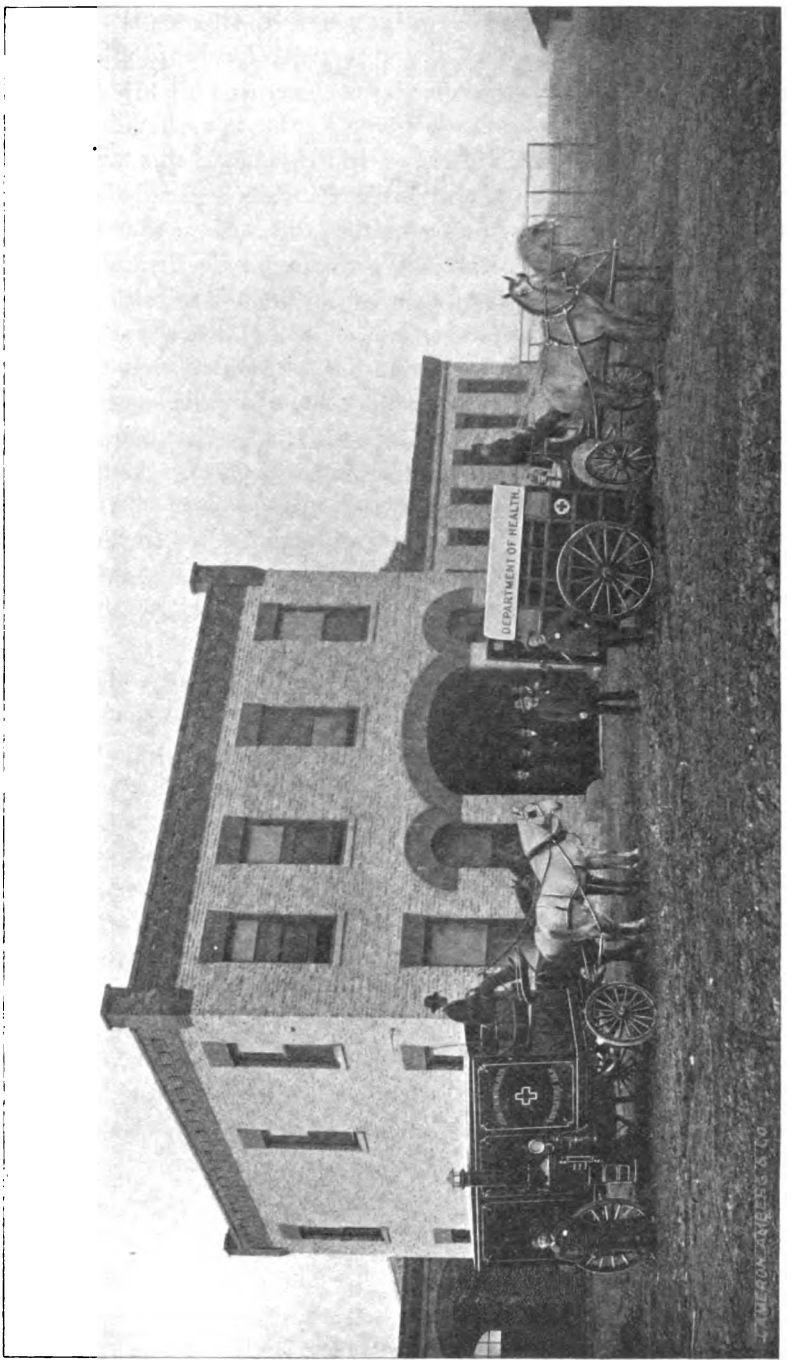


FIG. 34.

Ambulance Barn, Chicago; showing Portable Steam Disinfecting Van and Van for carrying goods. From plate loaned by the Commissioner of Health.

corrosive sublimate, about enough to give a strength of one to one thousand when dissolved in a pailful of warm water. In Charleston a pound bottle of carbolic crystals together with directions for solution and use are sent to the house in each case of scarlet fever and diphtheria. In the District of Columbia formalin is given to the householder by the municipal disinfector. In most cities, as in Providence, this method of disinfection is left to the family, and unlike Providence the disinfectant is not furnished by the city. In a few cities this disinfection is done by city employees. In New York City, where public disinfection is done only in tenements and flats, men wash the floors with brooms dipped in a one to one thousand solution of bichloride, and for other wood-work sponges are used in a solution of one to 2,500. The mercuric salt is carried in thirty grain tablets and is dissolved at the house. In phthisis washing soda is used. In Rochester this washing is relied on as the principal means of disinfection. A man and woman are employed who wash all washable surfaces with bichloride or electrozone, and, at the same time, carpets and upholstered furniture are removed and beaten, and afterwards while the room is damp, it is fumigated with sulphur. In Newark the woodwork is washed with bichloride in diphtheria cases.

Details of Municipal Work in Disinfection. Many cities distribute to every family with communicable disease a circular explaining the methods of disinfection used. These, of course, vary in substance according to the practice in the different cities. The best general circular on disinfection that the writer has seen is that issued by the state board of health of Maine. As has been stated, most cities and many states require by ordinance or statute, disinfection after every case of communicable disease; but some cities, as the District of Columbia, St. Paul, and Providence, do not. Nevertheless, their municipal officers offer disinfection, and the offer is usually accepted by the householder. In the District of Columbia, until quite recently, formaldehyde apparatus was loaned by the city to the householder. Some cities have special employees to do their disinfecting work, while others require sanitary inspectors or medical inspectors to do it in addition to their other duties. The following shows what is done in a number of cities:

City.	Number of Disinfectors.		Annual Salary.
Baltimore	2	disinfectors	$800
Boston	1	chief disinfector	1,600
	10	disinfectors, per day	2.25
Brooklyn (Borough of)	4	disinfectors	900
Cincinnati	1	disinfector	800
Chicago	10	disinfectors	$1,000
District of Columbia	2	disinfectors	600
	3	disinfectors	300
Newark	5	disinfectors, per day	2.75

City.	Number of Disinfectors.	Annual Salary.
New York (Borough of Manhattan)	37 disinfectors	600 to 1,200
Providence	1 disinfector, per week	12
Rochester	1 disinfector	900
	1 disinfector	400
St. Louis	6 disinfectors	900
Worcester	1 disinfector, per day	2.75

In Cambridge, New Haven, Newton, San Francisco, Springfield, Mass., Wilmington, Del., and doubtless in many other smaller places the sanitary inspectors attend to disinfection, and in Brockton this is done by the inspector of plumbing.

In some cities the health officials rely upon the certificate of the attending physician to determine when the time for disinfection has arrived, but usually in scarlet fever the health officer or medical inspector personally examines the patient, and in most places where laboratory facilities are available one or more negative cultures are required in diphtheria. Whenever a disinfector is employed, it is usual for an order to be given him for each place to be disinfected, this order being issued by the health officer or medical inspector. This order contains the items which it is desired to record in regard to the disinfection of the case, and when returned signed by the disinfector is considered his report, and may be filed away as a record. The form used in Chicago is shown in Appendix 97. On some forms a list of several places, a day's work, is put on a single sheet. In Baltimore the return has a blank for the signature of the householder to enable the office to maintain a check upon the work of the disinfector. Sometimes there are a number of items in regard to the history of the case which the disinfector is required to gather at the time of his visit. This is the case in Newark where the disinfectors placard the house and do practically all the work of medical inspectors. In Pittsburgh[1] a card index is kept of all disinfections

[1] SIZE 3 x 5 INCHES.

DISINFECTION.

No. Address St. Ave. A'y Ward

Householder (Patient)

Disease No. Rooms

Capacity

Hours exposure to formaldehyde gas Amount

Room tests; K.-L. B. growth hrs. Anthrax Spores growth hrs.

Steam sterilization C. Spores growth hrs.

Spores growth hrs. ○

Result

[illegible]

[illegible]

[illegible]

vas bags large enough to easily receive a mattress have been used. They are bound on three sides with rope and have a loop at the corners and the mouth of the bag is closed with a gathering cord. They cost about six dollars. The van used in Chicago for carrying goods is shown in the illustration on page 549. Often the disinfectors wear their ordinary clothes when about their work, but sometimes, as in Providence, a duster is worn outside and is frequently disinfected. In some cities, as Philadelphia, New York, and Waltham, a complete overall suit of duck or similar material is worn during disinfection.

Several cities, as Philadelphia and Milwaukee, have printed rules for the guidance of their disinfectors. When the disinfector has arrived at the house and found everything in readiness, he is to at once proceed to his work. This varies of course with the character of the disinfection which the city furnishes, and the space to be disinfected. If isolation in one room has been faithfully carried out, the problem is much simplified. Unfortunately, except in a few cities this is not generally done, and disinfection of several rooms is necessary. In small tenements of two to four rooms, usually the patient has been in all of them. In Toronto in such cases the inhabitants are removed by the city officials during the disinfection, to a waiting room, but the writer has not heard of such an arrangement in the United States. In our cities either the inmates are simply turned out, or a part of the house is disinfected on one day and the remainder on another day. In many cases, doubtless, when it is claimed by the family that isolation has been maintained, it has not been, and a single room is disinfected when the whole house needs it just as much. Directions printed or otherwise are usually left at the infected home early in the disease giving directions how to disinfect clothing and bedding that can be washed. An example of such circulars is shown in Appendix 98. One of the best and most complete circulars on disinfection is that issued by the state board of health of Maine. Soaking in a disinfectant and boiling is usually recommended and, as has been said, disinfectants for this purpose are sometimes furnished as in Providence, but in that city at least they are rarely called for till the termination of the disease when they are almost always left by the disinfector — formalin for clothes and spraying upholstered furniture, and corrosive sublimate for washing woodwork. In Providence, during the course of the disease, clothes which are to go to a laundry are called for by the health department wagon, and after steaming are delivered at the laundry in that city also. When washing is found at the house of a washerwoman where there is communicable disease it is removed and steamed, and, if already laundered, it is then returned to

the owner. Laundered clothing is not injured at all when properly steamed in a jacketed chamber. In Rochester when the disinfectors visit a house they put the soiled clothes to soak in a bichloride solution, and in Newark in formalin 1 to 5,000.

School books and books belonging to public libraries are liable to be infected and are difficult to disinfect. In the case of cheap school books it is doubtless economical to burn them, and this is done in Providence and probably in other cities. In Philadelphia the same plan is pursued in regard to library books, but in Providence these are disinfected with steam, being first set on edge with the leaves apart. This of course destroys leather bindings but causes no other injury.

In Cincinnati the clothing manufacturers' association employs a man to disinfect for them all clothing which may have become infected in the process of manufacture.

Disinfection of Vaults, Yards, Gutters, etc.

Formerly when the filth theory of disease dominated nearly all sanitary work, disinfectants were freely applied to all places where filth accumulates. The health department issued circulars showing how disinfection could be done and sometimes distributed the materials. In some cases the officers actually did the work of disinfection. For many years in New York City and Philadelphia the health department have disinfected gutters and yards with copperas, but recently "electrozone" has been used in Philadelphia.

At the present time it is considered better to remove filth than to disinfect it, and as to the danger of its giving rise to infectious disease it has been shown that ordinary filth has little if anything to do with scarlet fever, smallpox, whooping cough, typhoid and typhus. It is still not certain how the virus of yellow fever is spread, and it is the opinion of many that it is developed in filth, so that in southern cities which fear this disease, disinfection of filth is held to be more important than it is in northern cities. In Baltimore one man is employed to prepare carbolate of lime which is distributed for the disinfection of vaults and drains. In Charleston, in 1898, carbolic acid was furnished to 800 persons and lime to 39,782 persons, and there was also distributed 141,300 gallons of copperas solution, one and one-half pounds to the gallon. During the summer time in that city a wagon is kept constantly at work distributing these materials, but if the citizens need them in the winter season they must call at the health department for them. In Baltimore carbolate of lime is made by the health department and distributed from the

police stations. In Boston the disinfecting corps during summer do a good deal of this disinfection, as shown by the table given below.[1]

In New Orleans, in 1897,[2] during the outbreak of yellow fever, the following unique method was adopted for the disinfection of the surface of the ground:

"A number of small gasoline furnaces on rollers, throwing a sheet of flame on the ground, and used by the Barber Asphalt Company for repairs to asphalt streets, were loaned us by that company in New Orleans. These furnaces, which were capable of generating such an intense heat as to burn quickly green vegetables, refuse, and other household debris, without odor, were utilized in the worst infected localities.

"Owing to the danger of setting houses on fire, the manipulation of these machines required the greatest care. Mr. Farrar secured the services of an engine of the fire department to attend each corps of this disinfecting brigade. The mode of operation was as follows: All trash and other debris of the yard and alley were removed to the street and then quickly incinerated by the furnace. The yards, alleys, and the exterior of houses were then thoroughly washed with a powerful stream of water furnished by the fire engine, and afterwards the furnace was rolled over the alley, yard, banquette and streets, after the fashion of ironing a garment in a laundry."

When yellow fever occurred, the whole block was disinfected with bichloride of mercury and chloride of lime. The board of health states:

"It has been our practice, as far as possible, to throw a cordon of disinfection around the infected district. All drains and sinks and surfaces were washed with a bichloride of mercury solution 1-500. The vaults and other places where filth or decomposition existed, were disinfected with chloride of lime. The chloride of lime was used in the strength of three pounds to the average vault, and was used quite freely, when possible, under the houses and also in the street gutters."

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[1] Boston, Report of Health Department (1899), p. 37:

PLACES DISINFECTED IN BOSTON, 1899.

Streets	333
Places	1,137
Courts	1,184
Alleys	4,113
Yards	15,599
Vaults	1,126
Cellars	9,276
Gutters	574
Water-closets	8,856
Passageways	6,336
Urinals	765
Vacant lots	898
Filthy rooms	3,843
Filthy sheds	6,597
Sinks	13,137
Cesspools	14,336
Total	95,291

[2] Louisiana, Report of State Board of Health (1896-97), pp. 42 and 76.

During this outbreak there were used 21,793 pounds of chloride of lime, 1,743 pounds of bichloride of mercury, and 4,391 barrels of lime and 260 barrels of copperas, besides formaldehyde and sulphur for house disinfection.

Bacteriological Laboratories.

The development of the serum culture as the most valuable means of recognizing diphtheria was the chief cause of the establishment of the municipal or state bacteriological laboratory, though something had been done previously to that time. As early as 1888, what was probably the first municipal laboratory was established in Providence by the energy of Dr. G. T. Swarts, who was at that time medical inspector. The work done by Dr. Swarts at first was on water supplies and filters, and he also made use of the laboratory in tracing an outbreak of typhoid in 1888, which was due to pollution of the city supply. The first state laboratory was also established by Dr. Swarts in 1893, when he was elected secretary of the state board of health. There seems to be no difference of opinion as to the necessity for the maintenance of a bacteriological laboratory by all cities of considerable size, say from 75,000 to 100,000 inhabitants, and even by smaller cities if a state or university laboratory is not immediately available. Laboratories have been established in a large number of cities of the size mentioned. For the country and smaller cities, of course, the maintenance of a bacteriological laboratory would not be warranted by the amount of work needed. For such communities the state laboratory was established. At present the state board of health is thus equipped in Colorado, Delaware, Louisiana, Maryland, Massachusetts, Minnesota, New Jersey, Ohio, Rhode Island, Tennessee, and Vermont.

In Minnesota in 1898 it was reported that thirty-two towns made use of the state laboratory. In Massachusetts in the same year, although there are a number of local laboratories, there were examined by the state board of health 1,591 diphtheria cultures, 415 specimens of sputum and 132 specimens of suspected malarial blood.

When state laboratories were first projected much difficulty was experienced in sending specimens to them. The post office department refused to accept infectious material or wet or liquid matter; but mailing boxes were devised which are approved by the post office department. Sometimes cultures are sent to distant laboratories by express.

There are three uses to which bacteriological laboratories may be put. The original and principal purpose of these laboratories is to perform routine work in the diagnosis and control of communicable diseases. The second purpose is to engage in such work as the production of the antitoxins, vaccine, tuberculin, etc. The third purpose is

the pursuit of original investigations, work which more properly belongs to state, federal, or university laboratories, but which sometimes can best be done in connection with municipal work.

The equipment of the laboratory and the working force employed will of course vary according to the use to which it is to be put. If the laboratory work is to be simply the routine work of examining diphtheria cultures, tuberculous sputum, and typhoid and malarial blood, an extensive laboratory is not needed, and unless the city be a large one, a single bacteriologist with perhaps an assistant to do the manual work, is all that is really needed. The cost of such a laboratory need not be very great, as a skilful worker can get along with very simple and inexpensive apparatus. He must, however, have a first-class microscope, in the purchase of which parsimony does not pay. Only $300 was at first expended on the Denver laboratory in which much very valuable work has been done. This expenditure included the microscope. In Hartford the same amount was spent exclusive of the microscope.

If the city is a large one the expense may be somewhat increased in the increased amount of apparatus required. If it is intended to encourage original research, more elaborate arrangements are necessary. Original scientific research is not properly one of the functions of municipal government; but sometimes knowledge is almost entirely lacking for the solution of some pressing municipal problem, and it is perhaps wise to undertake research which should have been made by others, but which has been neglected. Thus in Berlin the erratic working of the filters called forth the researches of Piefke upon the mechanism of continuous sand filtration; the bad odors in Boston waters almost necessitated the original work on the flora of the water, done under the direction of the superintendent of the works, to determine the cause of the trouble, and in Providence the investigations of Weston as to the efficiency of a "mechanical" filter about to be adopted by the city called public attention to the value of a method of filtration concerning which little had before been known. Certain lines of investigation can best be conducted in the municipal laboratory. Methods of practical house disinfection can best be studied there and such questions as the variation in the morphology and physiology of the diphtheria bacillus and its distribution. Another reason for offering facilities for original research is that by so doing greater inducements are held out for the services of first-class men, who if they were not afforded such opportunities, would surely gravitate to the universities. For these reasons some of the larger cities, as Boston, New York, Philadelphia, and Pittsburgh, have seen fit to establish bacteriological laboratories on a somewhat generous scale.

The following are some of the salaries paid for bacteriological work:

City.	Bacteriologists and Assistants.	Annual Salary.
Baltimore	1 bacteriologist	$1,500
Boston	1 bacteriologist	2,500
	1 bacteriologist	900
	1 clerk	728
	1 assistant.....per week	13
Brooklyn	1 bacteriologist	760
	1 assistant	300
Buffalo	1 bacteriologist	1,500
	1 assistant	1,200
Cambridge	1 bacteriologist	1,000
Charleston	1 bacteriologist	900
Chicago	1 bacteriologist	1,800
	2 assistants	1,000
Cincinnati	1 bacteriologist	600
Columbus	1 bacteriologist	400
Denver	1 bacteriologist	1,500
Fitchburg	1 bacteriologist.....per culture	1
Hartford	1 bacteriologist	600
Lowell	1 bacteriologist	600
Lynn	1 bacteriologist	900
Minneapolis	1 bacteriologist	1,000
Newark	1 bacteriologist	2,000
Newark	1 assistant	666
New Haven	1 bacteriologist	800
New York	1 director	2,500
	1 assistant director	2,000
	2 assistant directors	1,600
	12 bacteriologists	1,200
Newton	1 bacteriologist	800
Pittsburgh	1 bacteriologist[1]	2,000
Philadelphia	1 director	2,400
	1 assistant	1,200
	1 assistant	900
	1 assistant	700
	1 clerk	1,000
	1 helper	600
	1 helper	500
Rochester	1 bacteriologist	1,200
St. Louis	1 bacteriologist	2,400
St. Paul	1 bacteriologist	1,200
	1 assistant	300
San Francisco	1 bacteriologist	1,800
Springfield, Mass	1 bacteriologist.....per case	2
Syracuse	1 bacteriologist	1,000
Worcester	1 bacteriologist	700

[1] Has other duties connected with the Bureau of Health.

At present bacteriological laboratories have been established in all of the forty principal cities of the United States except Albany, Atlanta, Cleveland, Jersey City, Omaha, Paterson, Richmond, Scranton, and Toledo. Probably many smaller places do bacteriological work, and among such that have come to the notice of the writer are Brookline, Mass., Montclair, and Orange, N. J., and Ottumwa, Ia.

It is only the routine diagnostic work of the laboratory which will be considered in this connection. The different diseases will be considered separately.

Diphtheria.

In the official diagnostic work done in diptheria and other infectious diseases health officials have been far in advance of the medical profession. Almost as soon as simple methods of technique were developed for the recognition of the diphtheria bacillus, sanitary officials were offering to make such examinations for physicians; but the physicians were not ready to avail themselves of the assistance offered, as they had not generally become aware of the value of the latest results of bacteriological research. The first step then in utilizing the serum culture as an aid in the diagnosis of diphtheria was the publishing of information as to its value, and the method by which it could be employed. The earliest bacteriological laboratories issued to the medical profession, as the first step in their work, a circular giving information concerning the value of the serum culture in the diagnosis of diphtheria. As this knowledge has now become common property such a preliminary circular ought not to be necessary, but even as late as October, 1899, the agent of the board of health of Brookline, a residential suburb of Boston, found it advisable to call the attention of the practicing physicians to the value of cultures, although the health departments of his own and the neighboring cities had been using the culture method for four or five years.

The outfit for diphtheria cultures consisted at first of a slant tube of Loeffler's blood serum and another test tube containing a sterile cotton swab, both tubes being carried in a box just large enough to hold them. This is also the outfit still generally employed, but in several cities certain modifications have been adopted. The original swab consisted of cotton wound on the end of an iron wire and placed in a test tube the same size as the serum tube and plugged with cotton. In Philadelphia a number 14 aluminum wire is used. This is preferred because it can be readily cleaned with dilute sulphuric acid, and because the end can be readily nicked with a knife to keep the cotton from slipping. In Boston, brass wire is used with one end roughened to hold the cotton.

In Providence a tinned [illegible] wire is employed, number 17 wire [illegible] with the end [illegible] flattened to [illegible] these wires [illegible] [illegible] wires. Absorbent [illegible] [illegible] Boston [illegible] [illegible] of fine grade [illegible] [illegible] is used because it is desired that the swab [illegible] In Providence [illegible] is used just as it [illegible] In Chicago the swab is formed of a wooden skewer [illegible] being a little smaller than the rest. The swab is kept in a tube of only slightly greater diameter than the skewer and slightly shorter and it is kept in by means of the rubber part of a medicine dropper. Professor Ernst of Harvard University gave up the use of the swab entirely and substituted a small platinum wire about three inches long. This is fastened in a small brass tube and this in turn kept in a little larger tube. When it is to be used it is pulled out from the larger tube and stuck in the other way with the wire projecting. This was used in Boston and other Massachusetts cities for which Professor Ernst examined and is still employed in Cambridge and Fitchburg. See Fig. 37.

The serum tubes are almost always not far from one-half inch inside diameter, though somewhat smaller tubes are sometimes used. The length, however, has varied considerably. The tubes used at first in Boston were six-inch, while those put on the market by Parke, Davis & Co. are four-inch. The most common lengths are five and six inches. Common test tubes were used at first and are to some extent at present, but the loss from breakage is very great and it is annoying and sometimes dangerous to have them break after inoculation. Hard glass ignition tubes without lip are generally preferred. The prices vary of course with the price of glass, but for a year or two such tubes have been furnished by Whitall, Tatum & Co. at $3.60 per gross. The Boston board of health purchase thick tubes without lip, of J. Elwood Lee Co. of Coshocken, Penn., at $13 per thousand. Recently in Providence about two inches of the tube has been etched with hydrofluoric acid to furnish a surface on which the name of the patient may be written. See Fig. 35. The serum tubes are, of course, plugged with

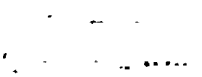

FIG. 35.

Swab Tube used in Providence, with etched surface for writing name of patient.

cotton through which evaporation takes place quite rapidly and this drying up of the serum has rendered it very difficult to keep the tubes at the depots in a suitable condition. In Philadelphia the tubes are covered with rubber, medicine droppers with the rim cut off, being used for the purpose. In Providence small nipples were used but the plan was abandoned as it proved hardly worth the trouble. In Baltimore the tube is sealed by inverting it and dipping the cotton in melted parafine. In Boston a small cork is concealed in the cotton plug to check evaporation. In the District of Columbia the cotton is pressed down into the tube and a sterile cork inserted. In Chicago the use of the tubes for serum has been given up and small flat aluminum boxes are substituted. These are filled with serum and covered, and when sterile, a rubber band is put around the box, making a pretty tight seal. These boxes are compact and do not break and it is claimed that they can be conveniently incubated in an inside vest pocket. They cost $13.50 per thousand and are made by the Illinois Can Company of Chicago. Dr. Gehrmann states that unless great care is taken to obtain perfectly pure aluminum they corrode very rapidly. See Fig. 36.

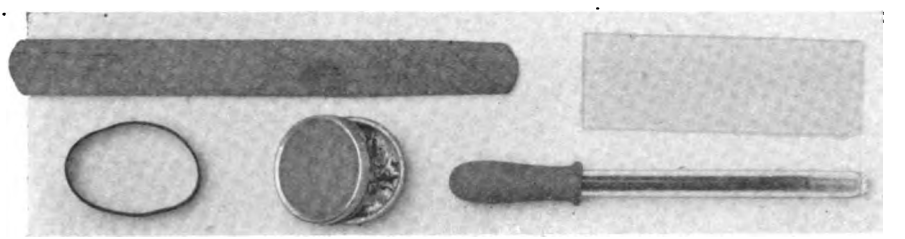

FIG. 36.

Chicago Diphtheria Outfit. Wooden spatula, glass slide for smear, aluminum box for medium, with rubber ring to close it, and swab enclosed in tube; all enclosed in a strong envelope.

The outfit used by Professor Ernst contains two serum tubes, one of which is intended to be inoculated from the throat and the other from the nose. One of the difficulties of keeping drug stores and physicians supplied with serum tubes, is that the serum rapidly becomes dry, and if used in this condition, gives very unsatisfactory results. In a few cities serum tubes are not sent out at all, swabs only being supplied to the physicians. This is done in most cases in Columbus, O., Manchester, N. H.. in Minneapolis, New Haven, Pittsburgh, Providence, Rochester, Springfield, Mass., and in the Delaware and New Jersey state laboratories. It has been found by experience in these cities that better results by far are obtained by this method than when poor serum tubes are used by physicians, as they certainly will be if generally distrib-

uted. If the swab is returned to the laboratory within a few hours and rubbed on a good serum tube, it gives as good results as when it is rubbed on the serum at once. At least this was the result of a large number of comparative tests made in Providence. One advantage of this method is that the bacteriologist is more likly to swab the serum thoroughly than is the practicing physician. In Pittsburgh[1] it was found that better results were obtained from swabs which had been kept even as long as a number of days, than from tubes which had been inoculated at the bedside and kept out of the incubator for some hours. It was explained that tubes so kept probably allowed the growth of saprophytic bacteria which obscured the examination, while no such result occurred if the tube was inoculated just before it was put in the incubator. The Minnesota state laboratory, however, did not get quite as good results with swabs.

When a serum tube and a swab tube are sent out together as a "diphtheria outfit," as is done by most laboratories, the two are enclosed in a box which may be made of various materials. In Cambridge and Fitchburg the boxes are made of copper of the style shown in Fig. 37. These boxes are 1 by 2 by 6 inches in size and cost eighty

FIG. 37.

Diphtheria Outfit used in Fitchburg. The wire is used for inoculating the serum; a swab in the upper tube is for cover glass examinations.

cents. They are made by Peter Gray of Boston. The advantage is that they can be readily sterilized and are strong and durable. Their disadvantage is that they are expensive and heavy. When they were used in Boston the department lost about fifty a year and gave them up as they were too expensive. In Buffalo a round wooden box with a screw cover is used. In Cincinnati and Denver a package made of a block of wood bored with two holes is preferred. In New Haven where a swab tube only is sent out, it is enclosed between two grooved

[1] Pittsburgh. Report of Bureau of Health 1895, p. 103.

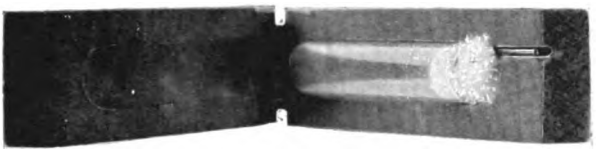

FIG. 38.

Swab sent out for diphtheria cultures in New Haven, between grooved and hinged blocks.

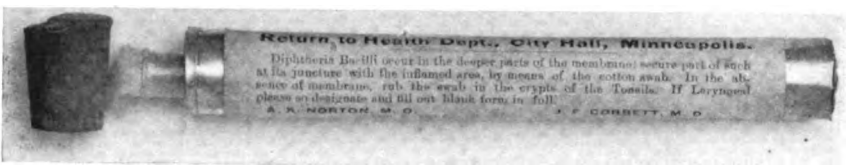

FIG. 39.

Swab used for diphtheria cultures in Minneapolis. No serum tube is sent out.

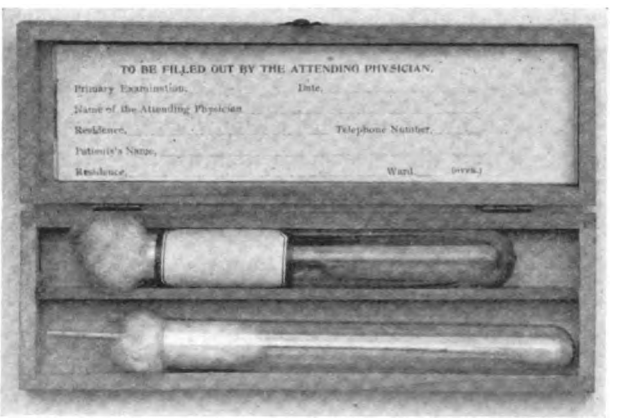

FIG. 40.

Diphtheria Outfit used in Philadelphia.

pieces of wood hinged at one end. Fig. 38. In Minneapolis the swab tube is sent out in a tin box. Fig. 39. In Newark, New York and Philadelphia wooden boxes, as shown in Fig. 40, have been adopted. These cannot be sterilized by heat, as they are glued and varnished, but they may be washed with a disinfectant. They may be obtained of Bloomingdale Bros., Third Avenue and Fifty-ninth Street, New York, at a cost of $6 per hundred. They are cheap, light, and fairly durable.

In Baltimore, Boston, the District of Columbia, and Providence, pasteboard boxes are preferred. They are made of size to hold two

tubes and cost $7 per 1,000. They are used only once. Similar boxes are used by the Rhode Island state board of health but they have a partition and cost $1 more. Fig. 41. In Chicago the aluminum box

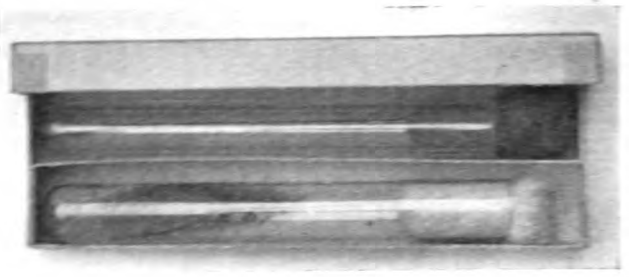

FIG. 41.

Diphtheria outfit used by the State Board of Health of Rhode Island: pasteboard box with serum tube and cotton swab.

and the small swab tube are sent out in a tough brown paper envelope. It is certain that the package containing a diphtheria outfit is pretty likely to become infected and should not be sent to another case unless disinfected. The metal boxes are disinfected when they are used, but the wooden boxes rarely are. In the District of Columbia they were formerly disinfected by washing with a solution of corrosive sublimate, one to two hundred, but they are now disinfected with formaldehyde gas. In New York City they are disinfected. The pasteboard boxes are used only once in Providence and the District of Columbia, but in Boston they are disinfected with dry heat and used several times. It is important also that the outfit should be as light and compact as possible, qualities which have been secured in the Chicago outfit. In Philadelphia the culture box is sealed when it leaves the laboratory. It also contains unused seals which may be used by the physicians. In Boston and some other cities a spatula made of a thin strip of soft pine five and one-half by five-eighths of an inch is supplied with each outfit and is to be burned at the house. These are purchased of Schlegel & Fottler, seedsmen, at $1.25 per thousand.

The culture outfit usually contains two printed slips, one containing directions how to take the culture, and the other being a form on which the maker of the culture is to note various items of interest to the bacteriologist or the health officer. Below[1] is a form of direction

[1] DIRECTIONS FOR MAKING CULTURES IN CASES OF SUSPECTED DIPHTHERIA:

"The patient should be placed in a good light, and, if a child, properly held. In cases where it is possible to get a good view of the throat, depress the tongue and rub the cotton swab gently, but freely, against any visible exudate. In other cases,

which is commonly used and seems to be explicit enough, but physicians sometimes fail to follow it on the first trial. In Providence where a great many outfits are supplied to physicians at the department office, directions are not put in the boxes there, as almost all who call are known to be familiar with the operation.

In most cities outfits are not distributed to physicians at the health office but are left at stations to be called for by the physician when needed. Experience, however, has shown that they are taken by the physicians and sometimes kept by them a long time and used when very dry. It is the usual custom to leave these outfits at various drug stores scattered in convenient portions of the city. In Buffalo and Philadelphia they are kept at police stations and in Pittsburgh at police and fire stations. In the smaller cities and towns there is no need of such a general distribution, and even in Cambridge they are kept only at the laboratory and office of the bacteriologist.

It is of course necessary for the physician to see that his name and that of the patient accompanies the outfit on its return, and most laboratories have required him to note many other items. When this system was introduced it might have been necessary to ask for more information than now need be required. If there is no official supervision of the case, the report of the physician is the only way in which information, interesting from a scientific point of view or useful for the work of the laboratory, can be obtained; but if the case is to be fol lowed up as it should be, all desired information can be obtained by the medical inspector at his visits. The less the physician is asked to note on a written report, the more satisfactory will it be. Some of the physicians' memoranda which accompany diphtheria outfits have many items. See Appendix 99.

In Philadelphia the memorandum is in a cardboard book of eight pages $1\frac{1}{2}$ inches by $5\frac{1}{2}$ inches, which is filed away when returned and serves as a permanent record; it also has blanks on it for the record of the examination. A card is sent out in Baltimore, and on its return is used as a permanent record. See Appendix 100.

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including those in which the exudate is confined to the larynx, avoiding the tongue, pass the swab far back, and rub it freely against the mucous membrane of the pharynx and tonsils. Without laying the swab down, withdraw the cotton plug from the culture tube, insert the swab, and *rub that portion of it which has touched the exudate gently* BUT THOROUGHLY *back and forth over the surface of the blood serum.* Do not push the swab into the blood serum, nor break the surface in any way. Then replace the swab in its own tube, plug both tubes, put them in the box, and return the culture outfit at once to the station from which it was obtained.

"A report will be forwarded the following morning by mail, or can be obtained by telephone, after 12 noon."

There is a list of stations on the reverse.

All that is required in Providence is the filling of the form shown below which is stamped on the cover of the box. All the other items can be readily obtained in other ways, and the filling out of such a small memorandum causes the physician very little trouble, and it pays the health officer to trouble the practicing physician as little as possible.[1]

In Providence the medical inspector has found it convenient to carry a number of tubes in a large package and mark each tube. The tubes have the upper two inches etched with acid and are written on with an ordinary lead pencil. In some cities, as Baltimore, New York, and Philadelphia, a different memorandum, one containing fewer items, is sent out with outfits intended for secondary cultures, but as culture outfits will not always be used when intended, confusion must sometimes result.

It is necessary that all the old tubes should be called in, and fresh tubes supplied at intervals. This is done every two weeks in Baltimore, every six weeks in Hartford, every two months in Boston, and every three months in Cincinnati. In Providence all physicians who ask for them are supplied with swab tubes and boxes which they may keep in their offices or buggies.

In some cities, as Baltimore, Cambridge, and Providence, the physician must return the inoculated tube to the laboratory, but usually outfits may be returned to the drug stores and other stations, and provision is made for their collection from these. In New York City there are a number of main stations which the laboratory messenger visits at 4 P. M. The other stations send the boxes to these before that time. In Pittsburgh the sanitary police collect the tubes at 4.45 P. M., and in Philadelphia and Buffalo they are collected by the police. In Buffalo as soon as the box is received at the police station it is wrapped in a paper with one edge gummed so that it can be sealed and endorsed on the back with the name of physician, name of receiver, and time received.

A list on a printed blank, of the physicians and number of outfits, is sent from the stations each day with the package of boxes.

In Boston the cultures are sent by the drug stores to the laboratory before 6 P. M. The messenger receives twenty cents for each trip, and

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[1]

If there is any water in Serum Tube, POUR IT OUT.

Name of Patient Residence

Doctor's Name Date

RETURN TO CITY HALL.

there is a desire on the part of druggists to secure the privilege of keeping outfits. In Newark there is a collector of cultures who receives $750 a year. In Chicago, Detroit, and Providence, if the physicians telephone to the health department a messenger is sent for the outfit. In some of the larger cities the health department is kept open all night for the reception of diphtheria cultures, while in other cities the bacteriologist sometimes has an incubator at his house, as in Cambridge, Chicago, and Denver.

While a serum culture is supposed to give correct results in ninety per cent. of the cases, direct examination of a smear from the throat or the swab will only give correct results in from thirty to fifty per cent., yet sometimes it is so desirable to ascertain the result of the examination promptly, that the examination of the swab may be resorted to. This is done when requested in many laboratories. Of course a positive result only is considered decisive in such cases. In Boston they are made in from five to ten per cent. of the cases. In about the same number of cases an examination of the growth on the serum is made after the latter has remained five hours in the incubator.

The technique of the laboratory will not be discussed, but only those matters which more directly concern the relations of the health department to the physician and the patient. Suffice it to say that the very best professional work should be done with the greatest care to avoid any mistake. In large laboratories the slides are often examined by two persons, and two or three cover slips are often taken from each culture. In Philadelphia and Buffalo in order to correct any mistake which may have arisen, the slides are kept for one year.

Accurate records should be kept of all examinations. In Providence the laboratory record is entered by the examiner in a common blank book as he makes the examination, the principal forms of organisms being noted. The result of the examination whether positive or negative is also entered on the record slip of the case. In Baltimore and Philadelphia, as shown above, the examiner notes his findings on the physician's memoranda, which are preserved, arranged alphabetically or by streets. In other cities a separate slip is filled out by the examiner, and in New York all slips are kept in envelopes, on the outside of which is a summary of results, and the envelopes are arranged in drawers.

After the examination is made the result is sent to the physician as soon as possible. Most laboratories send their reports by the afternoon mail of the day next after the taking of the culture. Most laboratories offer to answer all telephone requests after noon. In Providence nearly all important cultures are examined before nine o'clock of the next day and are telephoned the physicians before that hour, at which time most

of them go out on their morning calls. The same method is pursued in Brookline, Mass. All reports are telephoned in Cincinnati. When cultures are examined in another city from that in which they are taken, as when the work is done by the state laboratory, results are often telegraphed at the expense of the city sending the cultures: but in all cases reports are sent by mail even when they are also telegraphed or telephoned. Communications by mail are sometimes sent on postal cards, as in Baltimore, Buffalo, and Providence, but usually they are sent under seal as physicians prefer it. Very often the reports of positive and negative results are sent on cards of different colors or are printed in different colors as in Boston and Philadelphia. Sometimes the report simply states the fact that diphtheria bacilli have or have not been found in the culture referred to. Occasionally other items are added to the report besides the mere statement that diphtheria bacilli are found. In Pittsburgh it is stated whether the diphtheria bacilli are

1. In pure culture.
2. Associated with staphylococci-streptococci-bacterial mixture.

The form used in Chicago is shown in Appendix 101.

It is seen that this form is used for reporting both positive and negative results, but as was before stated, usually different and distinctive blanks are used for reporting positive and negative results.

Many of the blank forms state in addition that the case in all probability is not diphtheria and will not be treated as such. It seems unwise to send out such a notice, for it has been shown that the margin for error on the first culture is certainly eight or ten per cent., and this is too large to warrant the phrase "in all probability." It would be better to call attention to this chance of error and suggest that if any doubt as to the nature of the case exists, another examination should be made. Such a suggestion is made in the Philadelphia form.

A certain number of examinations will always be unsatisfactory and indeterminate, and usually in such cases a special form of report is sent out, most of which have been copied from that used in New York City. See Appendix 102.

The Baltimore report adds very properly that another culture is desired.

Besides sending the report to the attending physician the bacteriologist in New York City sends to each medical inspector a list of all cases in his district which have that day been examined with the results of the examination. In Providence in those cases which the attending physician has turned over to the health department for final cultures, reports of the results are sent to the family.

Tuberculosis.

The aid given to diagnosis by bacteriological examinations in tubercular phthisis, though not as great as in diphtheria, is very important. Most bacteriological laboratories offer the same facilities for bacteriological examinations in phthisis as in diphtheria, but some do not. Cambridge, Detroit, Fitchburg, Hartford, San Francisco, and Worcester, and most of the state laboratories make this test. As in diphtheria, explanatory circulars are usually sent out to physicians as a preliminary to the introduction of this system. In most cities physicians are expected to furnish the receptacle to contain the sputum. Much annoyance is sometimes caused by the use of improper and leaky receptacles, and sometimes suitable ones are furnished by the laboratory. This is done by the state laboratories of Delaware, Rhode Island, New Jersey, and in Pittsburgh and New York City; and in Rhode Island the outfits are left at the same depots as the diphtheria outfits. The outfit used in Rhode Island consists of a glass bottle with screw cap made of metal and enclosed in a stiff pasteboard box. In Pittsburgh an ordinary wide mouth stoppered bottle in a plain wooden box is furnished. Accompanying the outfit are directions and a blank on which the name of the patient and certain clinical data are to be filled in by the attending physician. See Appendices 103 and 104.

In New York unless the name of the patient accompanies the sputum, the result of the examination is not sent to the physician, but a notice to that effect is sent instead. Otherwise the result is sent, a positive result on one form and a negative result on another, the latter calling attention to the indecisive character of failure to find bacilli.

A record book is kept for all examinations and the data furnished by the physicians are also recorded. A separate book is kept for institutions and all cases are noted on a large atlas.

Typhoid.

As for tuberculosis so for typhoid, fewer laboratories offer facilities for its diagnosis than for diphtheria. The first step is the issuing of a circular of information and the preparation of an outfit for collecting and sending the blood to the laboratary. Various methods are employed for the latter purpose. Theoretically the best method is to collect a little blood in a capillary tube, but practically it is difficult to get this done properly, and tubes are rarely provided. In Providence such tubes have been used to a slight extent but not with much success. In New York City an outfit is sometimes used which consists of a small glass bulb in a wooden box, a felt vaccine shield and a bit of cantharides plaster. The latter is applied to the skin and protected by the felt

shield. After a blister is raised the glass bulb is filled from it by gravity and the end sealed. Fig. 42. The most common method is to recommend that the blood be collected on a piece of paper. In the Baltimore

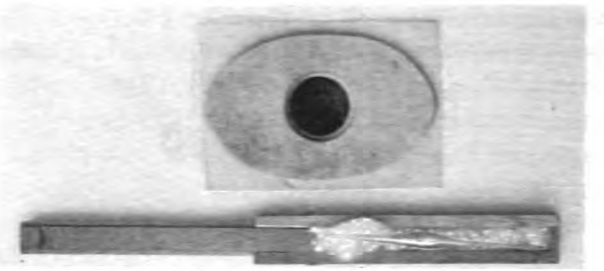

FIG. 42.

Typhoid Outfit used in New York City. Cantharides plaster for raising blister and capillary tube for serum.

city laboratory a piece of paper 2 x 3½ inches is sent out with the directions that about five large drops of blood should be allowed to dry upon it. In Delaware and New Jersey a piece of paper four inches square is used folded like a powder paper. The Boston outfit is shown in Fig. 43. The Maryland state board of health sends out small tin boxes like

SIZE 3½ X 4½ INCHES.

FIG. 43.

Typhoid Outfit used in Boston.

those used in Chicago for diphtheria cultures. These are sent out in pasteboard boxes. In Minnesota aluminum foil is used, and after the blood is gathered upon it it is made into a roll. In Denver, Newark, New York City, Pittsburgh, St. Louis, and some other cities, glass slides in a wooden box are used. See Fig. 44.

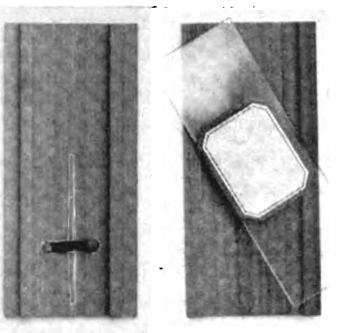

FIG. 44.

Typhoid Outfit used in Newark.

In Chicago a bit of sterilized mica is wrapped in a sheet of paper and is enclosed in an envelope directed to the health department. The mica is preferred because it does not break and does not absorb the blood.

Printed directions accompany the outfit and also a blank to be filled by the attending physician. The form used in Baltimore is shown in Appendix 105.

Reports to the physician must be made and sometimes two forms are used, one for negative and one for positive reports. In Pittsburgh only one form is used for all cases. Records are kept of all examinations, either on cards, as in Baltimore and Pittsburgh, or in book form.

Malaria.

This disease, though not of bacterial origin, has received some attention from health department laboratories. Most laboratories do not offer to examine blood for the malarial organism, but it is done by the state laboratories of Massachusetts and Maryland, and the city laboratories of Lowell and Baltimore. In Charleston it is the principal work of the laboratory. The blood is collected and sent in on cover glasses in the manner prescribed in the directions issued by the laboratory.

Bacteriological laboratories are occupied chiefly in the diagnosis of the diseases just considered, diphtheria, tuberculosis, typhoid fever, and malaria; but they sometimes offer their assistance in other directions. As a bacteriologist must be a good microscopist, his aid may sometimes be asked in the diagnosis of rabies, actynimycosis, glanders, trichinosis, gonorrhœa, cerebro-spinal-meningitis, or almost any parasitic disease, but it is seldom that a public offer of assistance is made in any of these. Recently the bacteriologist of the health department in Minneapolis offered assistance in the diagnosis of cerebro-spinal-meningitis and a

number of cases were investigated by him by means of spinal puncture.[1] In Chicago considerable work has been done in the diagnosis of epidemic influenza. The examinations were made chiefly from cultures of the bronchial secretions grown on blood serum. Some examinations were made of the bronchial secretions direct.[2] In Boston many examinations are made for glanders, and in Minnesota for rabies.

Persons familiar with danger are apt to become careless of their own safety, and bacteriologists are no exception to the rule. A number of cases are on record where they have been infected during their laboratory work. The health officer should guard against this as against all other means of spreading communicable disease, and the board of health of New York City has adopted rules for laboratory work which are intended to reduce the danger to a minimum.[3]

[1] Minneapolis, Report of Health Department (1899), p. 30.

[2] Chicago, Bulletin of Department of Health (January, 1899).

[3] New York, Report of Department of Health (1896), p. 222:

"The following rules for the prevention of possible infection in the bacteriological laboratories of this department must be strictly obeyed. The assistant directors in immediate charge of said laboratories will enforce the same:

"First — After handling tubes, bottles, etc., containing diphtheria cultures, samples of sputum or any other possible infectious material, or any culture made from the same, the hands must be thoroughly washed with soap and water, using a nail brush, and must then be rinsed in a solution of bicloride of mercury, 1 to 1,000. This must be done immediately after handling such material, and before proceeding to other work.

"Second — The hands must be washed and rinsed as above when leaving the laboratory at the lunch hour, or at the conclusion of a day's work.

"Third — Desks must be thoroughly wiped off at least once daily with a solution of carbolic acid, 5 per cent. Floors must be mopped with the same solution at least once weekly.

"Fourth — Samples of sputum, diphtheria culture tubes and all other possible infectious material, together with all cultures made from the same, must be sterilized as soon as work on them is concluded.

"Fifth — The blanks accompanying samples of sputum must be sterilized immediately after unwrapping samples.

"Sixth — Vials, receptacles, corks, wrappers and everything accompanying samples of infectious material must be sterilized as soon as possible."

"In addition to the above, more specific rules have been formulated and posted, regarding the precautions to be taken in handling specimens of sputum. These are as follows:

Directions for Handling Samples of Sputum.

First — Receipt of samples:

(*a*) Remove outer wrappings and burn them at once.

(*b*) Place samples, with blanks, in metallic box and cover with layer of cotton, moistened with 5 per cent. carbolic acid solution.

(*c*) Wash the hands with soap, etc.

Second — Preparations of specimens for examination:

(*a*) Mark blanks and specimens for identification.

(*b*) Sterilize blanks.

Vaccination.

Vaccination is rightly considered the most important individual prophylaxis against smallpox and a very valuable means of controlling outbreaks of that disease. The ideal condition would be the maintenance of complete vaccination in every individual in the community. By that means smallpox would be entirely abolished. At the time of the discovery of this measure, it was hoped and expected that this desirable result would soon be accomplished; but the difficulties in maintaining complete vaccination in every one are so great that the end desired seems scarcely nearer than it did a century ago. While it is true that there are in the United States, few, if any, communities which are even approximately protected in this manner, it is also true that vast numbers of individual men, women and children are so protected; and it is furthermore true that in a majority of outbreaks occurring in our cities, vaccination is employed with great effect in subduing them. It is also certain that the vaccination which we have is due almost entirely to the active exertions of sanitary officials.

Vaccination Legislation.

Vaccination legislation is very largely statutory, though there are a good many local regulations on the subject. Federal laws concerning vaccination operating uniformly throughout the United States, would of course from a practical standpoint be the most desirable, but they are not permitted under our constitution. The most that the federal government can do is to legislate concerning the vaccination of passengers included in foreign and interstate traffic. Under the authority of an act of congress the secretary of the treasury has issued the following order to inspectors at foreign ports:

"Steerage passengers and crew, coming from districts where smallpox prevails in epidemic form, or who have been exposed to smallpox, shall be vaccinated before embarkation, unless they show evidence of immunity to smallpox by previous attack or recent successful vaccination."

Steamship companies also require vaccination and it has been for many years the custom of state and municipal quarantine stations to require the vaccination of immigrants. At Portland, Ore., all unvaccinated immigrants are required to pay twenty-five cents for being vaccinated.

(*c*) Wash the hands with soap, etc.

(*d*) Make smears, put away specimens, wipe desk with 5 per cent. carbolic acid solution.

(*e*) Wash the hands with soap, etc.

(*f*) Stain smears and mount.

(*g*) Wash the hands with soap, etc.

The general grant of sanitary power, particularly of the power to legislate, undoubtedly confers authority to make rules in regard to vaccination even if the subject is not specifically mentioned. Power to "make rules necessary for the public health" would so evidently cover this subject that it is rarely named in enabling acts even if other specific subjects are referred to. It is recognized that nothing can be more necessary for the public health than to make rules for vaccination and to provide for its performance.

It does however sometimes happen that special power is given by statute to make such rules. Thus in Connecticut[1] "The health officers may adopt such measures for the general vaccination of the inhabitants of their respective towns as they shall deem proper and necessary to prevent the introduction or arrest the progress of smallpox." In Michigan[2] boards of health may order the vaccination of all children or others who have not been vaccinated within five years. In North Carolina,[3] cities, towns and counties may make rules requiring vaccination, and a similar rule is found in Virginia,[4] Colorado[5] and Kentucky.[6] The health officer in the District of Columbia, the board of health in Buffalo, and bureau of health in Pennsylvania cities of the second class have similar powers. In South Carolina the state board of health may order vaccination.[7]

Legislation concerning vaccination may have one of two objects in view. It may provide for the employment of this method of combating outbreaks of smallpox, or it may seek to secure the permanent immunity of the general population.

Colorado, Indiana and North Carolina merely authorize the local sanitary authority to provide for vaccination during the prevalence of smallpox, and even then only as an alternative to isolation. In Colorado the health officer is "to order the prompt isolation or vaccination of persons who have been exposed to smallpox." In North Carolina the superintendent of health on the appearance of smallpox is to vaccinate all poor persons in the neighborhood.

In Indiana it is a rule of the state board of health which must be promulgated by each local board of health when smallpox occurs or is threatened, "to compel a vaccination or revaccination of all exposed

[1] Connecticut, General Statutes (1888), Sec. 2607.

[2] Michigan, Compiled Laws (1897), Sec. 4465.

[3] North Carolina, Act of 1 March, 1893, Sec. 23.

[4] Virginia, Code (1887), Sec. 1733.

[5] Colorado, Act of 13 April, 1893, Sec. 42.

[6] Kentucky, Statutes (1894), Sec. 4610.

South Carolina, Chapter 78 of 1899.

persons." Similar provisions are found in New Jersey, but this state has other laws as well. The law for the District of Columbia also requires that all persons exposed to smallpox shall be vaccinated, and a similar ordinance is found in Mobile. In addition to this employment of vaccination, the statutes in North Carolina permit the municipalities to make rules in regard to vaccination, and in the District of Columbia allow the health officer to order a general vaccination at his pleasure. In New Mexico the governor may order vaccination and appoint vaccinators. In Georgia county and municipal authorities may order vaccination to prevent smallpox.

Most of the vaccination laws contemplate the vaccination of the whole population or certain large and susceptible portions of it. The vaccination of school children has very generally and for a long time been considered a practical and effectual method of securing the vaccination of the larger part of the population at a very susceptible period of life. It is argued, and rightly, that it is not only the right but the duty of the state to protect its schools against the invasion of communicable disease, and that this method of requiring the vaccination of pupils is a simple and effectual means of preventing the invasion of the schools by smallpox. It is, however, unwise to assume that the vaccination which is required before entrance into school will protect throughout the school course. If the vaccination is performed just before the beginning of school life and attendance does not continue beyond the twelfth or fourteenth year, one vaccination may perhaps be sufficient protection, but if the vaccination is done in infancy or school life extends beyond this age the degree of protection is probably very slight. It is certainly a grave mistake to assume that vaccinations in early life will protect a population when it has become adult. It is this assumption either actually made by or attributed to sanitarians by anti-vaccinationists, that has been the text for much of the literature of the latter. The vaccination of school children is a valuable means of keeping smallpox out of schools and is successfully insisted on in many states; but to rely on it to secure an adult immune population, is to rely upon a broken reed. Laws requiring the vaccination of school children have been declared constitutional in Indiana,[1] Pennsylvania,[2] New York,[3] and California.[4]

[1] Indiana, Report of State Board of Health (1894), p. 334.

[2] Pennsylvania, Report of State Board of Health (1895), Vol. II., p. 82. W. F. Sprague *vs.* J. E. Baldwin, *et. al.*, 1896.

[3] Brooklyn, Report of Department of Health (1895).

[4] California, Report of State Board of Health (1889–90), p. 40. D. K. Abell *vs.* O. C. Clark, 1890.

The following states have legislation concerning the vaccination of school children: In several states, Connecticut, Maine, New Jersey, and Ohio, the governing board of the public schools is authorized to make rules excluding all unvaccinated children, but they are not directed to do so. In Connecticut the board must pay for the vaccination of the poor. In Ohio the school board may exclude children who are not vaccinated and may call on the board of health to vaccinate children whose parents neglect to do it. In New Jersey the board of education is empowered to require the vaccination of all school children before admitted, and also to require their revaccination if smallpox occurs in the city or district. It is also provided that when the school census is taken, the unvaccinated children shall be so designated, and if their parents desire them to be protected from smallpox and are, in the opinion of the board of education, unable to pay for it, they shall be sent to any physician to be vaccinated, who shall receive from the town the sum of fifty cents.

In California, Delaware, Florida for cities of 2,000 inhabitants, Iowa,[1] Illinois,[1] Maryland, Massachusetts, New Hampshire, North Dakota,[1] New York, Pennsylvania, and Rhode Island, the statutes explicitly forbid the attendance at school of unvaccinated persons, and in Wisconsin a similar rule made by the state board of health was formerly in force, but has recently[2] been declared unconstitutional, the state board of health not having such legislative power. These laws differ somewhat, although none of them are very extensive. Perhaps one of the clearest is that of Delaware:[3]

"The trustees or commissioners of school districts, and boards of education, are required, within one month after the passage of this act, to oblige all children applying for admission to the free schools, and all children who have previously been admitted to the said schools, to be vaccinated, unless already protected from smallpox by vaccination or by an attack of smallpox."

Most of the laws are made applicable to public schools only; but in Florida the superintendents of all institutions of learning are to enforce the law, and in Iowa the rule applies to every person entering any school. A similar rule is enforced in the cities of Denver, Chicago, Cleveland, Minneapolis, Omaha, and St. Louis.

Though many of these vaccination laws are worded so as to apply only to pupils, yet it certainly ought not to be so, and is not in Iowa, where "every person entering any school" must be vaccinated, and in

[1] In this state it is a rule of the state board of health, made in accordance with the statute organizing the board.

[2] Wisconsin, Supreme Court, 23 February, 1897, State *ex rel* Adams *vs.* Budge *et. al.* School board.

[3] Delaware, Act of 21 March, 1883, Sec. 1.

Florida "no child or person" shall be admitted contrary to the rule. The same provision is found in the California and New York laws.

Most of the laws simply require that every pupil must be vaccinated, although of course this cannot be done in those who have previously had smallpox, and who would by a strict interpretation of the law, be excluded from school privileges. The exception in favor of those who have had smallpox is made in Delaware, New Hampshire, Pennsylvania, and Cleveland. In California the law reads:

"provided that any practicing and licensed physician may certify that the child or person has used due diligence and cannot be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be exempted from the operation of this act."

A still more important exception is found in Massachusetts:[1]

"No child who has not been duly vaccinated shall be admitted to a public school except upon presentation of a certificate signed by a regular practicing physician that such child is an unfit subject for vaccination."

In Florida[2] it is a rule of the state board of health that all children shall be successfully vaccinated unless some reputable physician certifies that it would be injurious to the health of the child to vaccinate it.

It without doubt frequently happens that a child is not in a suitable condition for vaccination but yet might very well be at school. It is to provide for such cases that the above were enacted; but it is claimed by some that this provision is abused, and many of the Massachusetts health officers think that the health officer alone should have authority to grant exemptions from the law. In Iowa children may be temporarily excused from vaccination if they are not well.

Several of the laws like that of Delaware merely require that the child be "vaccinated." In Massachusetts and New Hampshire he must be "duly vaccinated." In Florida and Rhode Island the vaccination must be "successful" and in Illinois the vaccination must be "proper and successful," and in the latter state the state board of health by whom the rule is made have defined very accurately what shall be deemed evidence of a "proper and successful vaccination." In Pennsylvania the rules of the state board of health formerly required that no pupil should be admitted who had not been successfully vaccinated within seven years. A similar rule is found in Chicago, Denver, Omaha, and Spokane, and in Cleveland the period is five years.

Outside the states mentioned as legislating on the school attendance of unvaccinated children, the important cities of Cleveland, Omaha, Spokane, Mobile, and Denver have local rules of a similar import

[1] Massachusetts, Chapter 496 of 1898, Sec. 11.

[2] Florida, Rules of the State Board of Health (1897), Rule 54.

enacted by the sanitary authority, and there are doubtless also a great many smaller places. In St. Louis it is a rule of the school board and has been sustained in the courts.[1] Even in some of the states which have a general compulsory vaccination law it is evidently not well enforced, and it becomes necessary for cities in such states to take additional precautions. Thus in Louisville, Ky., although in a state where it is required that every child be vaccinated before it is a year old, there is a local regulation requiring the vaccination of school children, and in 1894[2] the health officer found 8,039 school children requiring vaccination. Minneapolis, though in a state having compulsory vaccination, has a local rule concerning school attendance.

Sometimes the parochial schools have required certificates even when not compelled to do so by law. This was done in accordance with the direction of the bishop in Chicago in 1893 during the smallpox epidemic and in Providence in 1885, when the importation of smallpox from Montreal was feared, but it was not continued in either city.

In Florida no manufacturer is to admit an employee unless vaccinated. In Massachusetts the law provides that when the local board of health orders it, all manufacturing corporations shall at their own expense cause all their employees to be vaccinated, and the superintendents of all institutions for the dependent and defective classes shall do the same. In Kentucky all inmates of state institutions are required by law to be vaccinated. In Connecticut a law to secure the vaccination of workers in paper mills requires that paper manufacturers shall bear all the expense if any one of their employees is taken sick with the smallpox. In Maine the owners of paper mills must employ no one who is not vaccinated and must prepare a list of all employees in January and September, and the board of health must examine the employees in March and October.

The following is from Maryland:

"No small fruit-grower, canner, truck farmer, or fish packer shall take into his employ any person or persons who do not show written proof of vaccination of more recent date than July, 1898. Any person or persons violating this law shall be fined not less than $50 nor exceeding $500."[3]

The persons who handle the rags in paper mills have in past years been particularly affected by smallpox, the infection being carried in the rags. The benefits arising from vaccination have been so apparent to the paper makers of Massachusetts that the large manufacturers of paper have always been strong supporters of the vaccination laws of that state.

[1] St. Louis, Report of Health Commissioner, 1895-96, p. 44.

[2] Report of Health Officer for year ending 31 August, 1897, p. 5.

[3] Maryland, Order of State Board of Health, 6 March, 1899.

True compulsory vaccination contemplates the vaccination of the entire community. It seeks to secure immunity from smallpox by having every person in the community vaccinated. To bring about such a result in the United States with a population rapidly shifting from city to city and state to state and increased each year by large numbers of immigrants, it would be necessary to require the vaccination of all immigrants and to have compulsory vaccination laws in all the states. The latter we are far from having. Given a state even with strict vaccination laws, the amount of executive energy and espionage necessary to secure their absolute enforcement upon a shifting population is so great that it can hardly be expected that with our notions of government, it would be possible to have an immune population except perhaps for a brief time during some emergency. Yet there are a good many compulsory vaccination laws on the statute books of the different states and cities, and great effort is made in some localities to enforce them. Most of these laws, however, provide for the compulsory vaccination of children. Florida, Iowa, Kentucky, Maryland, Massachusetts, and Minnesota have laws of this character.

The Florida[1] law simply requires that parents shall have their children vaccinated whenever the health authorities shall direct. The Maryland statute is much the same. In Massachusetts[2] the law requires parents and guardians to cause their children and wards to be duly vaccinated before they attain the age of two years unless a regular practicing physician certifies that they are unfit subjects for vaccination. The most stringent law is found in Kentucky:[3]

"All persons of the age of twenty-one years and over, who have not been vaccinated, or, if vaccinated, not successfully, shall, within three months after this revision takes effect, procure their own vaccination or re-vaccination, as the case may be.

"All parents, guardians and other persons having the care, custody or control of any child or children, or who may have in their employ any minor or minors, shall have the same vaccinated; and every parent, guardian and person that may have the care, custody or control of any child born hereafter, shall have said child vaccinated within twelve months after its birth or after it comes under his or her care, custody or control.

"All persons coming into this state to abide or become citizens who have not been vaccinated, or who may have children under their care or control that have not been vaccinated, shall procure the vaccination of themselves and said children within six months after coming into the state."

In Iowa every person over one year of age must be vaccinated unless protected. While compulsory vaccination laws are found in only a few

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[1] Florida, Rules of the State Board of Health (1897), Rule 54.

[2] Massachusetts, Chapter 515 of 1894, Secs. 1–2.

[3] Kentucky, Statutes (1894), Secs. 4608–10.

states, there are quite a number of cities outside of these states which have local regulations of like character, as Denver, Jersey City, Memphis, New York,[1] Omaha, and Yonkers.

In Atlanta every resident of the city is required to be successfully vaccinated or to be vaccinated a sufficient number of times to make it evident that successful vaccination is impossible. A similar rule is found in Scranton.

In Nashville[2] it was ordered in 1900 that all persons who had not been vaccinated since 1 December, 1899, should be, but the rule was not to apply to persons seventy years of age or over, to women more than five months pregnant, nor to any too ill to submit to it.

There are certain states in which vaccination is not made compulsory by statute, but in which the local governments are authorized to make it so. Such states are Connecticut, Maine, Michigan, North Carolina, Virginia, and by their charters it is authorized in Buffalo, the District of Columbia, and Pennsylvania cities of the second class.

Louisiana[3] is the only state in which compulsory vaccination is forbidden by statute.

Up to the time of the introduction of bovine virus into the United States, humanized virus, so-called, was employed partly in the form of dried lymph on quills, partly by the arm to arm method, but mostly by triturating and moistening the crusts. Owing to the efforts of Dr. H. L. Martin of Massachusetts the attention of the medical profession was called to the merits of bovine virus, and Dr. Martin was himself the first to furnish a reliable form of this virus in commercial quantities. The use of bovine virus rapidly became popular and almost entirely displaced the humanized form.[4] A few physicians in all parts of the country are found who prefer humanized virus, but although it has been preferred by some owing to the better results obtained than from the ivory point bovine, it has not of late been much used on account of popular prejudice. Humanized virus one or two removes from the cow is recommended in Louisville.[5] For twenty-five years, and until within a year or two, almost all the vaccine virus employed in this country was bovine virus furnished on ivory points.

[1] New York City, Sanitary Code (1899), Sec. 168.

[2] Nashville, Order of Board of Health, 5 January, 1900.

[3] Louisiana, Chapter 180 of 1877.

[4] Humanized virus has been continuously cultivated in Providence, R. I., and it is probable that this strain is the only pure Jennerian virus to be found in the United States. It has been employed continuously since 1856 by the public vacainator, and since 1868 careful records have been kept of each transfer. Between 1868 and 1900 there were 638 transfers. The virus at the present time produces symptoms and a vesicle precisely like those described and figured by Jenner.

[5] W. P. White, Louisville Medical Monthly, January, 1895.

To provide or control the supply of vaccine virus is very properly considered one of the functions of the boards of health and has been provided for by statute in several states. Some states provide for the supervision and control of the vaccine made or used in the state. Thus in Massachusetts:[1] "All vaccine institutions in the commonwealth shall be under the supervision of the state board of health." This law only provides for the control of vaccine made in the state, and the law is of little value as no penalties are attached. The New Jersey[2] statute attempts a supervision of the virus used in the state. In California the virus furnished by the vaccine agent must be approved by the state board of health. The Maryland[3] law compels care on the part of the physician in selecting humanized virus. In Indiana it is a rule of the state board of health that no humanized virus shall be employed except in an emergency, and in Florida bovine virus is required. The Michigan statute also requires that bovine virus only shall be used in public vaccinations, and a similar rule is found in Denver and Omaha.

In only a few states have the state boards of health taken it upon themselves to carefully inspect the places where virus is produced, and to test the virus and publish the results of their investigations. The state board of health of Tennessee during the summer of 1898 directed the state bacteriologist to inspect the vaccine virus farms from which virus was sent to that state. As a result of the investigation the state board of health recommended vaccine from three places. In 1896 the state board of health of Pennsylvania[4] sent a bacteriologist to examine the principal vaccine establishments of the country. In all fourteen were

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[1] Massachusetts, Chapter 355 of 1894.

[2] New Jersey, Public Laws of 1895, p. 493, Sec. 4:

"That if the board of health of the state of New Jersey shall ascertain any vaccine virus, antitoxin or other animal product sold, or offered for sale, or held for sale or use within this state for prophylactic or remedial purposes, to be dangerous to human health, or so impure or inert as te be inefficacious in rendering immune or less susceptible to disease any person in whom such product may be used, it shall be lawful for the said board of health of the state of New Jersey to prohibit the further sale or use within this state of any vaccine virus, antitoxin or other animal product, as aforesaid, manufactured or produced by the party who shall have manufactured or produced such dangerous, inert, impure or inefficacious product."

[3] Maryland, Public General Laws, Vol. I., p. 786, Chapter 257 of 1872, Sec. 5:

"Any physician who shall knowingly or wilfully use any virus defective in its nature, by having passed through a scrofulous system, from having been taken from one laboring under any disease of the skin, chronic sore or other febrile or other disease, during the progress of the vaccine disease, or any crust which during the progress of said vaccine disease, was punctured or had sustained other injury, shall upon conviction thereof forfeit and pay a sum not less than $100, nor more than $500."

[4] Pennsylvania, Report of State Board of Health (1896), Vol. I., pp. 29, 99, 156.

visited by the bacteriologist together with a veterinary surgeon, and a most elaborate and complete investigation was made as to the characters of the farms and the methods employed, and the condition of the virus produced. Only four stations were found worthy of commendation. The Association of State Boards of Health[1] has appointed a committee which has investigated many of the farms with much the same results as given by the Pennsylvania board. The committee has not as yet made its final report recommending the proper method of dealing with this subject.

Something in the way of determining the character of the virus employed, at least of that employed by the municipal officers, has been done by several cities even outside of those which furnish their own virus. In 1895 the bacteriologist of the Chicago board of health tested a large number of samples of virus to determine which was most free from extraneous organisms, and as a result of the tests selected one make which was found to be considerably superior to others.[2] This was a glycerinized virus. Since that time each lot of virus received by the city has been tested: 1. For the presence of bacteria, moulds, etc. 2. For tubercle bacilli. 3. To determine its vaccinal value. The virus is received in lots of 5,000 capillary tubes, and of these ten samples are taken at random for each of the above tests. If the results of the tests are not satisfactory the whole lot is returned. This has sometimes been done because of the presence of a large number of bacteria and sometimes because of failure to "take." No tubercle bacilli have ever been found in this or in any of the numerous samples of other makes of virus that have been tested. The department of health of Minneapolis[3] also tests the virus used by its officers, for tubercle bacilli. In Brooklyn several makes of glycerinized virus were tested in 1896, but all were found to contain bacteria.[4] Charleston and Denver also test their virus for the presence of bacteria. In St. Louis and St. Paul the department of health tests virus for its vaccinal power.[5]

A number of states and cities have deemed it best to furnish virus, and in some cases to produce it. In California[6] there is a state vaccine agent who "must furnish genuine vaccine matter approved by the state board of health to any regular practicing physician in good standing in

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[1] Conference of State Boards of Health. Proceedings of 10th and 11th meetings, pp. 51 and 76.

[2] Chicago. Report of Department of Health (1895–6), p. 237.

Minneapolis. Report of Department of Health 1897), p. 3.

[4] Brooklyn. Report of Health Commissioner (1895–6), p. 107.

[5] St. Louis. Report of Department of Health (1896), p. 112.

[6] California. Civil Code (1886), Sec. 2994.

his profession in this state. He may charge and receive for every parcel of vaccine matter furnished the sum of five dollars, which is full compensation for his services and expenses." In Georgia the governor is to buy vaccine and distribute it to the "ordinaries of counties." In Louisiana the state board of health is to furnish "pure, fresh vaccine matter to the district sanitary inspectors and city physicians for the purpose of gratuitous vaccination," the expense to be borne by the state board of health. In Maryland the governor appoints a state vaccine agent who is to have his agency at Baltimore. The state maintains a vaccine farm and the product is distributed gratuitously. The agent shall advertise monthly in Baltimore and annually in each county.[1] In Mississippi the state board of health is to furnish virus to the local health officer when he orders it; but the health officer must previously (or in emergencies as soon as possible) certify to the county clerk the necessity for the order. The secretary of the state board of health must keep virus on hand and the board is to pay for the same.

The city of Mobile requires its health officer to keep on hand a supply of vaccine virus which shall be distributed to physicians free of charge. In Brooklyn, Minneapolis, Philadelphia, and St. Louis, virus is distributed without charge to private physicians. In St. Louis the physician is obliged to report on a blank furnished, the results of the use of the virus. Such distribution is not however common; but a number of cities, as Chicago, Denver, and Omaha, require the health department to keep on hand a supply of virus, presumably for its own use.

New York is the only city which prepares its own virus, which it has done since 1876. In 1895 this work was turned over to the bacteriological laboratory and methods of producing virus were thoroughly investigated with the result that the board introduced the use of glycerinized virus. The following is a description of the method employed.[2] The virus made by this board has in the hands of the writer given better results than any he has ever used:

[1] Maryland, Public General Laws (1888), Vol. I, p. 786, Chapter 257 of 1872, Sec. 11:

"The state vaccine agent is hereby required to take all steps necessary to reproduce from the cow true vaccine virus, for the use of physicians residing and practicing medicine and surgery in the state, and shall furnish none more than four removes from the cow, if practicable, and none that has not been produced under his own supervision and direction; provided, that he may take, use and furnish such virus furnished to him by any physician entrusted by him to procure the same; such virus not to be taken from the arm of a child less than three months old; and the said agent shall report annually to the governor, the particulars of his expenditures, and other matters connected with the duties of his agency."

[2] New York, Report of Board of Health (1896), p. 235.

"A red heifer calf about two months old, in good flesh and health, is placed upon a bench in a special operating room and strapped on its side with one hind leg fastened vertically against the back of the bench. The area between the thighs, covering about ten inches square and including the teats, is shaved and washed with soap and water, with hydrogen peroxide solution, and finally with sterilized water and then dried with sterilized absorbent cotton. On the area so prepared, one hundred spots are then scarified, each from a quarter to half an inch square. The blood is washed away with sterilized water, and when the bleeding has entirely ceased virus is rubbed on each spot very thoroughly for some minutes; the calf is then returned to its stall. It is examined on the third and following days, and when the vesicles are seen to be at the proper stage of development, which is usually on the sixth day, the calf is again placed upon the bench and the whole shaved area washed twice with sterilized water and once again with peroxide of hydrogen solution. All microscopic dirt and crust is removed and every scarification is cleansed as thoroughly as possible; then with a sterilized curette each scarification is scraped and every particle of pulp removed into a sterilized glass dish. The pulp taken is weighed, comminuted, and mixed with a measured amount of chemically pure glycerin, by being passed between glass rollers on which the glycerin flows. There is thus produced a brown syrupy homogeneous emulsion, which is then drawn by a filter pump into sterilized glass tubes, which when full are sealed in the flame at both ends. Each of these tubes holds about twenty cubic centimeters. Capillary tubes of the mixture are prepared at the same time. The greatest precautions are taken to insure cleanliness in the production and preservation of the virus. All instruments and receptacles are sterilized, and the operations of inoculation and collection are made as nearly aseptic as possible.

"Before the virus from any animal is used, first, the animal is sent to autopsy and its organs are examined by a veterinarian for any evidences of disease; second, two samples of the virus are given, one to the bacteriologist and the other to the medical tester of virus, and no virus is issued unless the reports of the pathologist, bacteriologist and clinical tester are all satisfactory. The clinical test consists in the inoculation of the virus by scarification, in three places on each of five children who have never been previously vaccinated. There is thus a case test of five and an insertion test of fifteen points, and unless the virus gives one hundred per cent. success in each, that is, unless there are fifteen vesicles formed as a result of the insertion, the virus is not used.

"When there is need for virus, the contents of a large tube are forced into a sterilized burette and from that drawn off in measured amounts into small sterilized vials, of which there are two sizes, one containing one-fifth of a cubic centimeter for ten vaccinations, and the other one cubic centimeter for fifty vaccinations. These vials are corked with sterilized rubber stoppers. If capillary tubes are needed, the virus is allowed to flow into a sterilized glass box, which is closed by a glass cover pierced by a hole which just admits a capillary tube. One tube after another is then passed through this opening into the virus and sufficient virus drawn into each tube for one vaccination."

It is not sufficient that laws shall require that persons exposed to smallpox shall be vaccinated, or that this shall be required of school children, or that general compulsory laws shall be upon the statute books. It is necessary that some one shall see to it that these laws are enforced, and it is also necessary that some public officer shall be entrusted with the actual work of vaccinating, at least so far as the poor are concerned. All of this work naturally falls within the province of the board of health. Sometimes these powers and duties are explicitly

imposed upon it, but often they are assumed in the general grant of sanitary power. Some of these duties are, however, occasionally thrown upon other officials.

In states where there is no statutory requirement for vaccination for school children, but where the authority to make such a rule is given to the local government, it is sometimes not the board of health that has this authority but the school board. This is so in Connecticut, Maine, New Jersey, Ohio and St. Louis. It would seem to be much more logical for the board of health to decide such a matter, and more logical still for the compulsory vaccination of school children to be insisted on by state law if it is allowed at all. For if it is useful and proper in one community, it is in all; but perhaps if public sentiment does not permit of a state law it is after all wise to let such cities and towns as desire the protection of their school children by vaccination, insist upon it.

The enforcement of school vaccination law must primarily rest with the school officials, teachers, superintendents and boards of control. This is directly provided for in most of the laws, as in California, Delaware, Florida, Maryland, New Hampshire, New York, Massachusetts, and in Indiana, Illinois, and Iowa, where the regulation is made by the state board of health, that board can call upon the school authorities to enforce it. Sometimes it is the teacher who is required by the statute to enforce the law by excluding the unvaccinated. More often it is the school board or school committee who are supposed to have full control of the teachers. In Maryland[1] the statute directs that no teacher shall admit an unvaccinated child and also that no trustee shall admit such. Practically it is, of course, upon the individual teachers that the labor and responsibility of enforcing this law must fall.

Manifestly, the only proper way for the teachers to see that the law is obeyed is to require from each child a certificate from some physician or officer that the child is vaccinated within the meaning of the law. The teacher of course is not usually competent to determine this fact. The Rhode Island law requires this certificate which must be from a "practicing pyhsician." Maryland also requires a doctor's certificate. Most of the states have no statute law on the subject but a number of cities have rules. Thus in Cleveland and other Ohio cities there must be a physician's certificate. In Omaha and Chicago the certificate must be from the health commissioner or some licensed physician. In Denver it must be from the health commissioner or some physician recognized by him. In Minneapolis it must be from a resident physician, and in Fitchburg it must be from the board of health.

[1] Maryland, Public General Laws (1888), Vol. I., p. 786, Art. 31.

The most explicit directions concerning the certificate are not found in any statute or municipal rule but in the regulations of the Illinois state board of health.[1]

In Chicago[2] a certificate is not to be given unless the cicatrix is "not less than one-third inch in diameter, depressed, dead white in color, characteristically pitted, and perfect in outline." The value of the character of the cicatrix as an evidence of the character of the vaccination is accepted by the above rules as it is by most physicians, but that a very "bad" cicatrix may result from a typical vaccinal vesicle is shown by recent observations of the board of health of New York.[3]

Different forms of vaccination certificates are shown in Appendices 106–109. In Maryland the vaccination certificate must give the source of the virus used.[4] Of course a physician cannot give a certificate of vaccination immediately after performing the operation, and as the teacher usually desires some proof that the child has attempted to comply with the law, a limited permit is sometimes issued, as in New York City.

In many places the teacher simply asks to see the certificate and destroys it or gives it back to the pupil. This loose method invariably

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[1] "Before being admitted as a pupil in any public school, every child must present to her or his teacher, a certificate signed by a legally qualified physician stating (1) *Name*; (2) *Age*; (3) *Residence*; (4) *Date of Vaccination* — as near as may be; (6) *Date of Examination*, accurately; and (7) *Result*, as shown on the child's person.

"The *date of examination* and the *result*, as shown on the person of the child, are matters which the physician must testify to of 'his own knowledge.'

"Children over the age of fourteen years (approximately,) must present certificates showing that they have been vaccinated, or re-vaccinated, as the case may be, *subsequent* to this age.

"A certificate from a legally qualified physician that a given child is protected by a previous attack of smallpox or varioloid; or that it would be dangerous at the present time to vaccinate a given child; or that such insusceptibility has been demonstrated as, in itself, amounts to protection — shall be accepted by school authorities in lieu of the 'satisfactory evidence' required by this order.

"Legally qualified physicians may obtain the *Scholars' Certificate* blanks from teachers, school directors, or other officers of public instruction; from county clerks; or by mail, direct from the Secretary's office at Springfield.

"Returns of Vaccination Certificates (Form No. 52) should be made on or before the 1st of January of each year. These should contain the names, (and all other information indicated on the return) of every child in attendance who has not been previously accounted for. Such information is not necessary concerning the scholars who have previously complied with the requirement; but it is desired that the total number of such scholars in attendance be reported upon the Return. All Returns should be made through the County Superintendent, who, after examination, will forward them."

[2] Chicago, Report of Department of Health (1895-6), p. 101.

[3] City of New York, Report of Department of Health (1896), p. 241.

[4] Maryland, Report of State Board of Health (1898), p. 21.

results in a lax enforcement of the law. Teachers should be required to keep a record of the vaccinal condition of all pupils for the inspection of the superintendent or health officer. This is required by the Rhode Island statute; but it is to be feared that in most cases the school vaccination laws are not well enforced unless a lively interest and supervision is maintained by the health department. This is not the case in the writer's own city, but from his own knowledge there are many towns in his state where the law is not well enforced. Reports of other cities sometimes show that the school department would be very lax if not assisted by the health department as appears from the reports of Chicago, Pittsburgh, Reading, Rochester, St. Louis, and Utica. In New Jersey, in 1898,[1] of 471,517 enrolled children in the schools, 106,879 were unvaccinated. In Chicago, in 1894,[2] the commissioner of health found 70,000 unvaccinated children in an enrollment of 189,000. It was also found that a number of unvaccinated children were attending school on a certificate which was given by some physician either carelessly or with wilful intent to evade the law.

There seems, however, to be no reason why school authorities should not enforce the law. In Providence the superintendent of schools sees that the law is obeyed so that there are practically no unvaccinated children in school and this without urging on the part of the health department whose sole province is to offer free vaccination at its office.

If vaccination is to be required for admission to school, it is both just and necessary that free vaccination should be afforded for those who cannot pay. As a matter of practice in the vaccination of school children, public vaccinators are not apt to enquire too closely as to the financial resources of parents, but vaccinate every child that can be reached. The family physician cannot fairly complain that he has lost a fee, if he has not taken the trouble to urge the vaccination of his clients' children before they reach the school age.

Many of the state laws provide for such gratuitous vaccination. In California, Connecticut, and New York, the school authorities are to provide for the vaccination. In California the trustees annually or when required by the state board of health must advertise by posting in two places that provision has been made for the free vaccination of those too poor to pay. The trustees are also required to make an annual census of all unvaccinated children of school age, and to provide vaccination for all such and give certificates, the cost to be paid out of the common school moneys. In Connecticut and New York the money is to come

[1] New Jersey, Report of State Board of Health (1898), p. 33.

[2] Chicago, Report of Department of Health (1894), p. 143.

from the same source. In New York the school officers may appoint a vaccinating physician (they are required to furnish vaccine in some manner) and fix his compensation. The school officers shall enumerate the unvaccinated children of school age in their districts, and shall send such as are unable to pay to the aforesaid physician who shall vaccinate and give a certificate. The school trustees shall in their annual report state the number of vaccinated and unvaccinated children in their districts.

In all the other states in which statutory provision is made for free vaccination it is the city or township which is to provide and pay for it, and often it is the board of health or health officer that is to vaccinate. In Maine, Michigan, New Hampshire, Vermont, and Virginia, the township is empowered to provide vaccination, but is not required to do so, except in Vermont on order of the state board. It is required of the local government in Delaware, Florida, Kentucky, Maryland, Massachusetts, New Jersey, Ohio, and Rhode Island. In Delaware the trustees of the poor for each hundred designate some physician who is to vaccinate all poor children who apply and give them certificates. In Maryland if no physician has been regularly appointed public vaccinator, a child unable to pay may apply to any physician who may vaccinate and on making an affidavit of the facts, can collect a fee of fifty cents from the town. In New Jersey much the same plan is followed. The school census shall show whether each child is vaccinated, and if a child is unvaccinated and in the opinion of the school authorities is unable to pay, a permit is given for the child to go to any physician, and such physician may vaccinate, and by presenting to the township such permit with the endorsement that the vaccination was successful, shall receive fifty cents.

In Rhode Island the towns are required to appoint vaccinating physicians and fix the fee. The physicians are to give due notice of public vaccination and are to record in a book the name of each child vaccinated and deposit the same with the town clerk. The clerks may charge fees for copies, i. e., certificates of vaccination. Almost always the certificates are given by the physician and the records are not often consulted.

Such are the school laws and the statutory provisions for their enforcement. Let us see what the cities and townships do in executing them.

In a few cases, as shown above in Maryland and New Jersey, the statute provides for the vaccination of the poor by any physician, and in Scranton a similar rule is in force, only the physician is to collect from the city his regular fee; but most cities and townships appoint

one or more physicians as public vaccinators who are to do all the gratuitous vaccination. In small communities the health officer frequently adds to his other duties that of public vaccinator.

The charter of the City of New York, Sec. 1225, provides expressly for the appointment by the board of health of such vaccinators. In Fall River[1] the clerk of the board of health, who is not a physician, does the vaccinating under the direction of the city physician.

There are three general ways in which these vaccinators may accomplish the object desired.

First. Due notice may be given that the vaccinator will be at a certain place at a certain time to vaccinate. In country places and small towns this is very frequently the doctor's office at the doctor's office hours; the doctor, of course, taking the precaution to provide himself with a sufficiency of virus at the beginning of school terms when his services are most in demand. In large communities the vaccination is usually done at the board of health, if its office is at some convenient place. In Cincinnati the physicians to the poor vaccinate at their offices. In Providence public vaccination is every Friday at 2 P. M., except during July and August. In Syracuse vaccination is done at the City Hall two days in the week. The rules of the San Francisco board of health require that the health officer shall offer free vaccination each day and advertise the time and place in two papers. New York City, Brooklyn, and St. Louis have free vaccination daily at the central office of the health department, and Chicago formerly did, but this has been given up in that city because it was believed to be harmful to crowd together so many children as appeared at such times.[2] In Pittsburgh, on the other hand, the health officer recommends that the vaccination at the schools be given up, and that free public vaccination be held twice each year in each ward. In those cities where a number of vaccinating physicians are appointed for house to house work, they are usually also required to vaccinate those who come to their offices. They must in Philadelphia have in front of their office "Vaccine Physician, Ward ——." In Providence free vaccination except during outbreaks of smallpox is taken advantage of almost exclusively by children under school age or those about to enter school. The number vaccinated in 1899 was 2,863, which is probably not much under the number of new children entering the schools that year.

A second method of securing the vaccination of school children and at the same time aiding in the enforcement of the law is for the public vaccinator to visit each school and vaccinate all unvaccinated children.

[1] Fall River, Report of Department of Health (1895), p. 12.

[2] Chicago, Report of Department of Health (1896), pp. 3 and 97.

In Wilmington the vaccine physicians who receive a salary of $100 per annum are to make quarterly visits through their districts. All persons vaccinated by them must be seen twice after the insertion of the matter, and the name, age, color and residence of each person vaccinated must be reported to the council at the end of each year.[1]

There are twenty-three vaccine physicians in Philadelphia, and in 1894 and in 1895 they vaccinated about 30,000 persons each year. In 1896 about 18,000 were vaccinated.[2] In Baltimore in 1897 the twenty-two vaccinators made 33,733 calls and vaccinated 12,905 persons, of whom 10,188 had not been vaccinated before. They gave 10,447 certificates.[3] In 1899 thirty extra vaccinators vaccinated 60,000 persons. In Chicago in 1898 200 physicians vaccinated 27,402 persons at a cost for services and virus of $12,397.66.[4] In New York house to house visits are made every year through the tenement house districts, ten vaccinators being employed.

Vaccinators must, of course, keep accurate records of all their work. These records may be kept in a large permanent record book if the work is done at an office, or in small memorandum books if it is done from house to house. In the District of Columbia a separate slip is sent in for each person and the slips for each vaccinator for a week are filed in a properly endorsed envelope.

The payment made to public vaccinators varies. They rarely receive a regular salary for such work exclusively. In Baltimore the salary is $900 per annum, in Chicago $1,000, in St. Louis $75 per month, in New York City $1,200, in Brooklyn $1,000, in Syracuse $500, and in Wilmington, Del., $100. Sometimes they are paid a fee for each successful vaccination, though often it is for each person vaccinated. In Mississippi the fee is twenty cents for the first 300, fifteen cents for all over 300 and up to 500, and twelve and one-half cents for all over 500. In Providence and Reading the fee is twenty-five cents and in Providence the vaccinator furnishes virus (humanized). In that city, in the house to house vaccinating in 1885, fifteen cents was paid, which is entirely too little. In Delaware, Maryland, New Jersey,

residing in the ward or wards for which he may be elected, and inquire whether any, and if any, what members thereof may be liable to smallpox disease, and if he find any person or persons so liable, he shall offer gratuitously his services, as vaccine physician of the ward, to vaccinate such person or persons. The vaccine physician shall receive forty cents for each and every case of successful vaccination performed in any part of the City of Philadelphia."

[1] Wilmington, Ordinances of 9 February, 1860, and 28 December, 1882.

[2] Philadelphia, Report of Bureau of Health (1896), p. 55.

[3] Baltimore, Report of Health Department (1897), p. 61.

[4] Chicago, Report of Health Department (1897-8), p. 19.

Philadelphia, and Pittsburgh the fee is fifty cents. In Scranton the vaccinator receives his usual office fee.

Methods of Vaccination.

For the following facts the writer is indebted almost entirely to the kindness of Dr. William N. Swift, of New Bedford, who collected the data for a paper read before the Massachusetts Medical Society, 1 June, 1894.

Formal rules for vaccinators are found in only a few cities, as Boston, Philadelphia, and Chicago.

Form of Virus. As has been said, bovine virus has for many years been almost the only virus used in the United States. Sometimes in epidemics, owing to the difficulty of getting a sufficiency of this virus, it has been necessary to fall back upon the humanized, but more often the reverse has proved true and the bovine has proved of great value in a sudden outbreak because a considerable quantity could be immediately purchased of the producers. The great advantage, however, of the bovine virus is that it effectually does away with the reason for any popular complaint as to the danger of the transmission of syphilis or other human disease. Until very recently most of the bovine virus used was furnished on ivory points, the tips of which are coated with lymph which flows after removing the surface of the eruption on the animals inoculated. These points are usually furnished in metallic cases containing ten each. Single points are sold in envelopes. In some cases, and this is a better way, the points are sold in glass bottles, and in others they are wrapped in paper and rubber or other protecting covering. When sent out in metal they should first be wrapped in cotton.

Very recently a large amount of virus has been furnished in capillary tubes. This method has become popular because of the great advantage possessed by virus which is mixed with from forty per cent. to sixty per cent. of glycerine. Such virus soon becomes nearly or quite sterile, and unless infection takes place during, or subsequent to the inoculation, always gives rise to a typical Jennerian vesicle. Virus on points on the other hand is very apt to be infected with pus producing organisms. This glycerinized virus is usually sent out in capillary tubes. These tubes are generally hermetically sealed at both ends but sometimes they are sealed with wax. The national vaccine establishment at Washington sends out glycerinized lymph in small parafine vessels, into each of which an ivory point is sealed with parafine. Mulford & Co. have a similar contrivance made of glass and sealed with parafi-

h tubes contain enough for one vaccination only,

any put up tubes containing enough for ten,

twenty, and fifty vaccinations. Some of the makers furnish a small rubber tube for attaching to each capillary tube so that the virus may be blown out. The Welker Company furnishes a large rubber bulb for that purpose, the Mulford Company a smaller bulb (1-2 inch in diameter).

The New York City board of health also sends out virus in glycerinized sterile vials corked with sterilized rubber stoppers. These are of two sizes, one containing 0.2 c. c. for ten vaccinations and the other 1. c. c. for fifty vaccinations.

Humanized virus was until recently used almost exclusively by the health department in Providence and was employed also somewhat in Philadelphia. Sometimes small quills are charged from the vesicle on the eighth day, and are usually used the same day, but more often crusts are employed. The crusts are prepared by trituration and the powder is made into a paste with a little glycerine and water.

Implements for Inoculation. Probably most of those who make use of ivory points use the point itself for scarifying. If care is taken to have sterile points this does away with any danger of infection such as might come from a lancet. The use of the point, however, is a little more painful than the use of the lancet, so that the latter is preferred by many. Another instrument, a simple scarifier, is sometimes used by public vaccinators and is occasionally furnished by the producers of virus.

Since the use of virus in liquid form has become more popular, needles are quite frequently used and are very generally furnished, one for each inoculation. This has been the practice in New York City, Denver, St. Paul, and Minneapolis. The use of separate needles or of the ivory points for puncture or scarification, provided they are surgically clean as they can readily be made, easily solves the problem of aseptic instruments. For those who prefer a lancet, it is not so easy to secure asepsis. Of the ninety-nine cities which replied to Dr. Swift's enquiries only Cambridge, Chicago, Utica, Newton, Newburyport, Mass., Petersburg, Va., and St. Paul reported that the instruments were sterilized. Cambridge, Chicago, and St. Paul stated that when a scarifier was used it was heated after each operation, and in Newton the lancet is thoroughly boiled before use and then dipped in boiling water for five minutes after each vaccination.

Cleansing the Arm. Thirty-nine of the ninety-nine cities reported that the arm was washed before vaccination, but in not more than twenty-eight was it claimed that the practice was constant. Several state that the arm was washed with water, and one or two that it was washed with soap and water. In Asbury Park one person prepares the

arm by washing and another vaccinates. Bangor, Me., reported that the arm was washed with soap and water followed by a ten per cent. solution of carbolic acid. In Lewiston, Me., it is washed with carbolic acid or corrosive sublimate. In St. Paul a five per cent. carbolic acid solution is used. One of the Boston vaccinators used a one to five thousand solution of corrosive sublimate, and in Council Bluffs a one to two thousand solution is used which is then washed off with sterile water. In Minneapolis listerine is used, and in Fitchburg, at times, creolin. In Elizabeth, N. J., Milwaukee, and New Bedford the arm is washed with alcohol. In Chicago the rule is that vaccinators shall refuse to vaccinate a dirty arm or a person with dirty clothing. In all cases they are instructed to thoroughly wash the arm before vaccinating.

From the above it may fairly be assumed that while in about a third of the larger cities of the United States some attempt is made to wash the dirt from the arm to be vaccinated, this precaution is even in those cities neglected, and there is usually very little sincere effort made to secure a really aseptic skin.

Methods of Inoculation. By far the most common method is to scarify a portion of the surface and rub in the virus. Minneapolis was the only city which reported that puncture which was done with a needle was the routine method employed. The skin is drawn tight and a good sized needle used. It is now rarely done in that city. A lancet is, however, sometimes used. The New York City board of health[1] recently made a series of tests to determine which was the best way to vaccinate, by scarification or by puncture. These scarifications were about three-eighths of an inch square and made with a needle, and the puncture was made by placing a drop of virus on the point of a lancet and inserting it obliquely into the skin. It was found that the former method was more certain to result in inoculation and the latter was freer from chance infection, but, on the whole, was not so desirable as scarification.

In scarifying all operators agree that it is very desirable not to draw blood, but only to scrape off the outer layers of the epidermis. Troy and Providence reported that the scarifications cover one-half square inch. New York City has after careful experiment decided upon three-eighths of an inch. In Wilmington, Del., the prescribed size is one-fourth inch, and in Boston one-eighth inch. All agree upon the skin over the insertion of the left deltoid as the best place to vaccinate, but an inspection of many arms vaccinated by many operators would lead one to think that few are particular, and that almost anywhere on the outside of the

[1] New York City, Report of Board of Health (1896), p. 241.

arm will do. Some persons insist on being vaccinated on the thigh. When quills or ivory points are used they are first moistened, and no city reported using sterile water for this. In Troy the skin is moistened at the point of scarification. The virus is then rubbed into the abrasion. When liquid virus is used it may be worked in with the lancet or needle; but a number of producers send out little smooth flattened sticks to be used for this purpose. Tests made by the New York board of health showed that it was very essential to rub the virus into the point of scarification very thoroughly. When it was merely smeared on it was much less likely to take. Jersey City reported that the skin is drawn tight and the virus is rubbed in for three minutes. In Chicago, Providence, and doubtless in many other cities the virus is rubbed into the scratches which are drawn open by keeping the skin tense.

It has been claimed by many that it is better to have a number of points of inoculation, and such is very generally the practice in European countries. In the ninety-nine cities investigated by Dr. Swift, the number of insertions is as follows:

"In fifty-one cities it is the custom to vaccinate at one point; in twenty-six cities at two points; in eleven cities at one or two points; in three cities at three points; in one at four points; in one at five points; in one at one to four points; in one at two to five points, and in two the answer was variable.

"The cities where it is the custom to vaccinate at one point include Chicago, New York, San Francisco, Philadelphia, Washington, New Orleans, Brooklyn, Detroit, New Haven, Portland, Me., Richmond, Va., Lowell and Lynn, Mass.

"It is the custom to vaccinate at two points in Boston, St. Louis, Milwaukee, Pittsburgh, Pa., Worcester, Mass., Savannah, Ga.; at three points in Providence. In St. Paul, Minn., two to five insertions are made, and at Minneapolis, Minn., five insertions were formerly made, but at present usually only one."

After Treatment. All agree that the arm should be dry, that is, the exuded lymph or blood should have coagulated before the sleeve is drawn over it. This is required rather to prevent the rubbing off of the virus than to prevent the rubbing in of septic matter. The only objection to glycerinized virus is that it dries so slowly that the patients are kept waiting a long time and on this account the public vaccinators in Boston decline to use it.

In twenty-six of ninety-nine cities, protection of the point of inoculation or of the vesicle is sometimes resorted to and in most of these it is the rule. In Hartford, Milwaukee, and New York City a loose soft cotton or linen bandage is used to protect from the harsher sleeve, and

in the latter city it is sewed into the sleeve. In St. Paul this is used only when colored underclothes are worn. It is probable that this is more often advised than actually supplied. In Lewiston, Me., and Utica a bandage of sterile gauze is used. In Allegheny, Bangor, Dubuque, Grand Rapids, Harrisburg, Lowell, and Rockport, Ill., court plaster, adhesive plaster, or isinglass plaster have been used immediately over the point of inoculation. In Allegheny the court plaster is curved over the vesicle to protect, being attached only at the edges. In Council Bluffs a corn plaster is put over the point of inoculation and protected by a bandage. Newton covers the insertion with oil silk or gutta percha and fastens the edges with collodion. In Providence various methods of protecting the vesicle were tried, such as large corn plasters, wire cages, and absorbent cotton fastened with collodion. None of these were very satisfactory, but the latter was the best. The vaccinator in Wilmington, Del., describes his method of protection as follows:

"Cut two pieces of carbolized gauze each ten layers thick, one and one-fourth inches wide and two inches long. In one of these pieces cut an ellipse one and one-quarter by three-quarters inches and place the piece of gauze on the arm so that the opening comes over the wound. Place the other piece of gauze over this and strap the whole on to the arm with three strips of adhesive plaster."

A similar method is followed in Lancaster, Pa. In Chicago and New Bedford a "loose sterile pad" is applied to the arm after vaccination. Mulford & Co. have recently put upon the market perforated paper shields with gummed edges which adhere to the arm. They are curved so as to raise them above the vesicle. They are used extensively and seem to serve the purpose well. Parke, Davis & Co. furnish an aluminum shield, and there is also a transparent celluloid shield on the market.

Brief directions for the care of the arm are sometimes given the child at the time of vaccination.[1]

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[1] New York City:

DIRECTIONS TO BE OBSERVED AFTER VACCINATION.

"Leave the arm bare, or cover it with a thin, loose sleeve of Calico or Muslin. Do not use a woolen sleeve, or put a linen band around the arm, as they irritate, and prevent vaccination from becoming perfect. If the arm becomes much inflamed after the tenth day, do not poultice it, but keep it covered with a cloth wet with lukewarm water.

"If any bad effects appear to follow vaccination, notify this office, and a physician will be sent to attend the case free of charge."

Providence:

"Don't rub or scratch or hurt the vaccine sore. If the skin over it becomes broken, get a few cents' worth of subnitrate of bismuth to dust on the sore so that it will not stick to the sleeve.

"Don't put a cloth around the arm or any kind of ointment on the sore."

The card on which the Providence directions are printed has upon it the number of the entry of the vaccination in the record book and is used by pupils as a temporary school permit.

Contra-indications to Vaccination.

There are certain conditions under which it is unwise to perform vaccination and these are well set forth in the directions to vaccinators in Chicago:[1]

"Vaccination being the artificial production of a constitutional disease, it is, manifestly, of the greatest importance that the individual whom it is proposed to subject to its influences should be in as good health as is fairly attainable. Therefore, weak, feeble or sickly infants, those presenting evidence of some disorder of nutrition or of functional disturbance, as from dentition, indigestion, etc., or suffering from diarrhea or other bowel affection or presenting chafed or abraded cutaneous surfaces on any portion of the body, or any form of cutaneous eruption; or during the period of weaning — should not be vaccinated except in the presence of smallpox contagion. Acute febrile diseases and intestinal and cutaneous — especially vesicular — affections tend to modify and complicate the vaccinal action, and these conditions, therefore, warrant the postponement of the operation until they have subsided. On the other hand, there are many chronic diseases of a grave character, syphilis, for example, which do not interfere with vaccination, nor contra-indicate the operation. This is especially true of scrofula and consumption, diseases which have been favorably affected to a very marked degree by the introduction of vaccination. Scrofulous subjects, however, or those exhibiting a pre-disposition to that cachexia, should not be vaccinated — except in cases of emergency — during the first year or two of life. Sound judgment dictates that they be protected during this early period of development from any serious constitutional disturbance — and the same may be said of those exhibiting a marked phthisical or tuberculous pre-disposition.

"Under ordinary circumstances, neither the menstrual period, gestation or lactation offers any obstacle to vaccination; but cases will occasionally present themselves in which some disturbance or complication of these functions may dictate its temporary postponement.

"The existence of erysipelas, diphtheria, or scarlet fever on the premises or in the immediate vicinity renders great care necessary, if, indeed, it should not positively forbid the operation. Recent exposure to the infection of these diseases also makes it advisable to postpone until after the period of incubation.

"As already intimated, however, there are few, if any, conditions which would justify neglect or even postponement of vaccination in the presence of the smallpox contagion.

"Within the above limitations vaccination should be performed during the first few months after birth — except in the presence of smallpox, when it should be performed *as soon as possible.*"

The success in vaccinating depends very much upon the care and skill of the vaccinator even when the best virus is furnished. The report of the New York City board of health in 1874–5, page 120, shows how much the skill of vaccinators varies and also how good men improve. Several men who only had a percentage of perfect results in

[1] Chicago, Report of Health Department (1895–6), p. 101.

primary vaccinations of about 75 per cent. during the first three months, rose to 98 per cent. and even 100 per cent. within a short time, while one man had an average for several months of only 80 per cent. perfect results. The percentage of success in 24,395 primary vaccinations was 86.65. In 1896 with the new glycerine virus there were 1,500 consecutive vaccinations without a single failure.[1]

Circulars of information concerning vaccination are sometimes distributed and in many places serve a very useful educational purpose, but in many other localities the only result would be calling out a flood of anti-vaccination literature, and scientific arguments have no influence with the public in the face of an unscientific harangue.

ANTITOXIN.

The free distribution of antitoxin by boards of health, at least in the larger cities, has been very common throughout the United States. This is doubless due to the example set by the board of health of New York City. This board by its investigation of the cultural method of diagnosis and the use of antitoxin in diphtheria became convinced of the great worth of both, and determined to introduce their use in this country. To do this both had to be made free, and considerable effort was made by the board of health to secure the confidence of the medical profession in them. It may not at first be apparent why the health department should distribute antitoxin any more than any other remedy; but there are several reasons why it should do so. In the first place it is expensive and the poor cannot afford to pay for it, and most cases of diphtheria are among the poor. It is true, aid for the poor should usually be furnished by the poor department, but it is much more convenient for the physician to get his antitoxin from the health department than from the poor department. In fact, he probably never would have been able to get it from the poor department. Antitoxin should be used promptly, and there is less red tape in the health department. The physician brings his culture to the health department and gets his antitoxin promptly for the asking. The health department should assist the physician as much as possible. Below are named some of the cities which early began the free distribution of antitoxin.[2]

None at all was supplied in Troy until 1900, and in Buffalo,

[1] New York City, Report of Board of Health (1896), p. 237.

[2] Atlanta, Baltimore, Boston, Bridgeport, Brookline, Mass., Cambridge, Chicago, District of Columbia, Concord, N. H., Denver, Fitchburg, Hartford, Haverhill, Mass., Lowell, New Orleans, Newton, Mass., Paterson, Pittsburgh, Portland, Me., Providence, Rochester, Salem, Mass., St. Louis, San Francisco, Syracuse, and Wilmington, Del.

Rochester, Utica, Albany, Hartford, and New Haven, the amount is not large for the ability of the patient to pay is carefully questioned. In other cities this is not looked into with so much care lest the patient meanwhile die, hence larger amounts are given away.

At first circulars of information setting forth the value of antitoxin were distributed, but such are not now necessary. In the larger cities, stations were established for the distribution of the material, usually the same drug stores as those at which diphtheria-culture outfits were kept. In the smaller cities, however, it is often given out only at the health department or at the house or office of the health officer, medical inspector, or bacteriologist, and even in as large a city as Pittsburgh this is the practice. Most cities supply antitoxin on the same conditions that it is furnished in New York City.[1]

The amount of antitoxin furnished physicians for their own use and the amount used by the medical inspector of the health department, varies much in different cities. Probably no greater efforts have been made to encourage the use of this remedy and to supply it through municipal inspectors than in New York, Chicago, and Baltimore. In Chicago, particularly, a large amount of antitoxin has been administered by the inspectors of the health department. From 5 October, 1895, to 31 March, 1896, 1,771 cases were thus treated by these officers. In New York City, in 1896, about three times as many cases were treated by municipal as by private physicians, but since then the latter have used it more and more. In most cities most of the administration is done by private physicians, the serum being furnished by the health department. In Providence, at first a syringe was furnished by the department, but this was of course soon found to be impracticable as well as unnecessary. The form of application blank used in Chicago is shown in Appendix 110.

In other cities a very simple written application only is required which may be used as a voucher.

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[1] "First. The Health Department will send a Medical Inspector to administer antitoxin upon the request of the attending physician. According to the wishes of the attending physician the Inspector will either follow his directions or will use his own judgment in the injection of the antitoxin. When physicians wish to have the Department Inspector administer antitoxin they should telephone the request to the laboratory.

"Second. The Health Department will furnish antitoxin free to any physician who needs it for a case of diphtheria, in which payment for the remedy is a hardship, on the condition that he will, at the completion of his attendance on the case, fill out and send to the Division of Bacteriology, on blanks furnished for the purpose, a full report of the case. These blanks will be found at the depots where the antitoxin is to be obtained.

"Third. The Health Department will sell antitoxin to those who can afford to purchase it."

Most cities require, or at least did require, a clinical report of each case treated, to be made by the attending physician. Blanks for this are furnished by the department. That used in Baltimore is shown in Appendix 111. In Providence no form of this kind is used but enquiry is made by the medical inspector concerning each case of diphtheria reported and if antitoxin is administered it is noted, together with the date of administration, upon the permanent record of the case. In Pittsburgh a card is used to record the bacteriological findings and the antitoxin data for each case. See Appendix 112.

Most cities purchase the antitoxin which they use and distribute, but a few produce it. This is done in New York, Pittsburgh, Philadelphia, St. Louis, and Newark, and was formerly done in Hartford and Boston. For a very large city like New York or Philadelphia it is doubtless more economical to produce antitoxin than to purchase it. In New York City it is estimated that it costs to produce 60,000 c. c. of 300 unit strength about $2,200, which is much less than it could be purchased for. But in order to get a high grade product it is necessary to continuously employ the very best scientific talent and the varying fortune of political life is not conducive to the success of the city in this direction, and it is perhaps well that more cities do not at present undertake it. In New York[1] in 1896 there were fifteen horses in use for furnishing antitoxin and from them were obtained from 114 bleedings 17,853 vials of antitoxin ranging in strength from 150 to 500 units per cubic centimeter.

In Pittsburgh[2] two horses are kept, though one furnishes all the serum required. In 1899 there were obtained and used 2,145 vials of serum of 2,000 units, some of which, however, was used in neighboring communities. The cost was about $3,000. The method employed in that city may be found in the report for 1895.[3]

In Newark[4] in 1897 five horses were used for obtaining serum. There were obtained 1,726 bottles, of which 1,321 were used in Newark and 268 sold outside the city for which $318.90 was received. The cost of the care of the horses during this time was $1,286.07.

In St. Louis in 1897[5] three horses were kept and 11,645 c. c. of antitoxin produced containing 150 units to the c. c.

Considerable objection has been made by private producers to the action of boards of health in selling their product. In New York City

[1] New York, Board of Health Report (1896), p. 226.

[2] Pittsburgh, Report of Bureau of Health (1898), p. 124.

[3] Pittsburgh, Report of Bureau of Health (1895), p. 116.

[4] Newark, Report of Department of Health (1897), pp. 49 and 63.

[5] St. Louis, Report of Department of Health (1897), p. 49.

the board of health has sold its antitoxin through the drug stores allowing the druggists a ten per cent. profit. Considerable amounts are sold to other cities, notably Chicago. An effort was made to prevent this by a legislative act but it was not successful. The charter of New York City permits such sale and the proceeds are to be devoted to laboratory uses.[1] A similar right is given to local boards of health in New Jersey.[2] To the New York City board of health is due the chief credit for the introduction into this country of the use and manufacture of diphtheria antitoxin. Furthermore this board because of its researches was enabled to make a much higher grade of antitoxin than was ever made before. The manufactures of antitoxin in this country would not have had a market or been able to manufacture the remedy if it had not been for the New York board of health; but it is entirely characteristic of a trade to turn about and strike at the scientific men to whom it owes its being.

There has been very little done in the way of state supervision of the manufacture and sale of antitoxin. In New Jersey the state board of health may prohibit the sale of antitoxin found to be impure and inert (see page 581). In Wisconsin[3] and Connecticut[4] it is unlawful to sell antitoxin without the owner's name. In New York[5] the state board of health requires that antitoxin must be stamped before it is offered for sale by the manufacturers and samples are frequently tested to determine whether they come up to the required standard. In several states, however, the state board of health has taken upon itself the task of testing the various antitoxins for sale.[6]

In California in 1895[7] the state board of health was authorized to distribute antitoxin through the state university. In Massachusetts the state board of health has for several years manufactured antitoxin and distributed it throughout the state through the medium of the local boards.

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[1] New York, Chapter 378 of 1897, Sec. 1226.

[2] New Jersey, Chapter 180 of 1895.

[3] Wisconsin, Chapter 159 of 1897.

[4] Connecticut, Chapter 252 of 1895.

[5] New York, State Board of Health Report (1898), p. 5.

[6] Ohio, Report State Board of Health (1897), p. 137. Pennsylvania, Report of State Board of Health (1896), pp. 29 and 208.

[7] California, Chapter 39 of 1895.

CHAPTER XII.

COMMUNICABLE DISEASES

(CONCLUDED).

Hospitals and Quarantine.

HOSPITALS for the care of communicable diseases are essential for their control. It is well nigh useless to attempt to enforce isolation unless means are provided in hospitals for the proper isolation of the many cases which are sure to develop under conditions where their isolation at home is impossible. It is not only for the welfare of the community, but also for the welfare of the patient that such hospital accommodation should be provided. Many cases of communicable disease cannot receive in their homes the care that they require, and oftentimes travellers, tramps, and inmates of asylums and general hospitals are attacked with communicable disease, and most of such cases should be for their own good at once removed to a suitable isolation ward.

Local governments are permitted, and in some cases required, by statute to erect and maintain such hospitals. Cities often have the authority to establish hospitals, and such authority unless it is limited by the proviso that the hospitals are to be for the poor, carries with it the power to establish hospitals for the care of communicable disease. Such general authority to establish hospitals is given to the city councils of cities and boards of trustees in the cities and villages of Illinois.[1] Sometimes, as in Maine, Minnesota, and South Carolina, it is provided that communicable disease hospitals may be established in emergencies. In other states, as Alabama, Colorado, Georgia, Maryland, Michigan, Massachusetts, New Jersey, Virginia, Wyoming, and in special acts for various cities, no such restrictions are placed on the authority given. In Michigan such authority is specifically given to the inhabitants of townships. In New Jersey[2] towns or townships may unite in the establishment of such hospitals and

" the total expenditure for lands and buildings for hospital purposes shall not exceed one-tenth of one per centum of the total sum of assessment for one year, for

[1] Illinois, Annotated Statutes (1896), Chapter 24, Sec. 26.

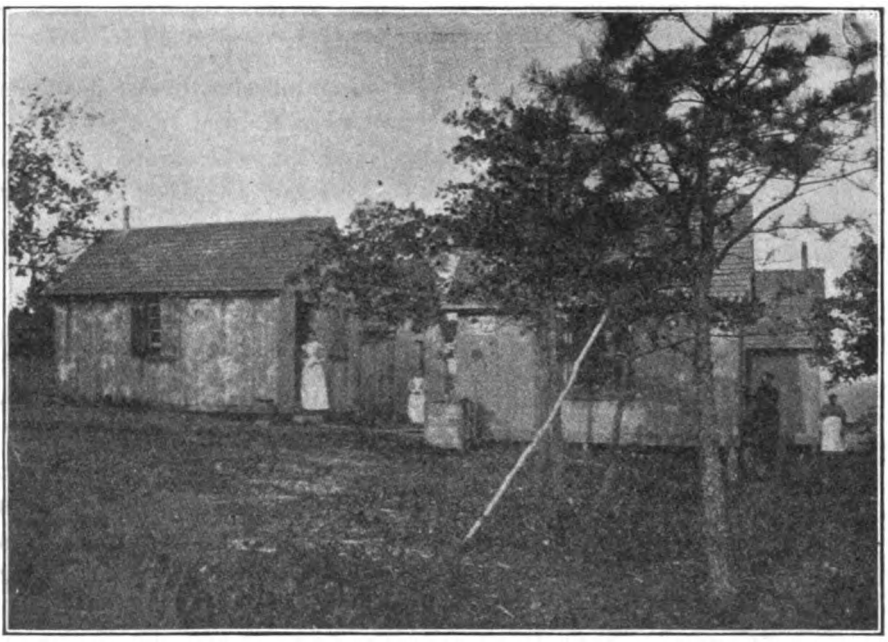

FIG. 45.

Smallpox Hospital at Asbury Park. Cost, $544.35. From Report of State Board of Health of New Jersey, 1896.

FIG. 46.

Smallpox Hospital, Pawtucket, R. I. Cost, $2,500.

the purpose of taxation in such corporated town, as shown by the duplicate, or other records of assessments for the previous year."[1]

In a few states the establishment of communicable disease hospitals is required by statute. The Massachusetts law enacted in 1701 is still on the statute books, but is probably intended to be enforced only in the emergency of a serious outbreak.[2] This law has been copied by Colorado, Minnesota, and Michigan, but in the latter state is applicable to smallpox only. In Massachusetts[3] the authorities are by an old law empowered to seize buildings for hospital use, and this is sometimes done even at the present time, as in Cambridge, where a dwelling was in 1899 seized for a diphtheria hospital. A similar provision is found in the charter of the City of New York[4] and in Colorado, Maine, Michigan, and Wyoming. In Virginia town councils and justices of the peace may establish temporary hospitals and may seize land for that purpose, but damages must be paid as appraised by commissioners appointed under the law. A more recent Massachusetts law provides that hospitals shall be established in cities when deemed necessary by the local board of health:[5]

"In any city in which no suitable hospital accommodations have been provided for the care and treatment of persons suffering from contagious diseases dangerous to the public health, the board of health of such city may address a communication to the mayor thereof, stating that in the opinion of said board the safety of the

[1] New Jersey, Public Laws (1895), p. 590.

[2] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 75. (First enacted 25 June, 1701 (Chapter 9). See Acts and Resolves, Province of Massachusetts Bay, Vol. I., p. 469):

"When a disease dangerous to the public health breaks out in a town, the board shall immediately provide such hospital or place of reception for the sick and infected as is judged best for their accommodation and the safety of the inhabitants, which shall be subject to the regulations of the board; and the board may cause any sick and infected person to be removed thereto, unless his condition will not admit of his removal without danger to his health, in which case the house or place where he remains shall be considered as a hospital, and all persons residing in or in any way concerned within the same shall be subject to the regulations of the board as before provided."

[3] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 43:

"Two justices of the peace may, if need be, make out a warrant directed to the [illegible] of the county or his deputy, or to any constable, requiring them under the [illegible]ion of the board to remove any person infected with contagious sickness, or to [illegible]ss and take up convenient houses, lodging, nurses, attendants and other neces[illegible]s, for the accommodation, safety and relief of the sick."

[4] New York City, Chapter 378 of 1897, Sec. 1170:

". . . It shall have power to take possession of and occupy for temporary [illegible]any building or buildings in said city, during the prevalence of an epidemic, [illegible]judgment of the board the same may be required, and shall pay for private [illegible]ty so taken a just compensation for the same. . . ."

[5] Massachusetts, Chapter 511 of 1894.

inhabitants of the city demands that suitable hospital accommodations should be provided for the reception and treatment of persons suffering from such diseases, other than smallpox and those of a venereal nature. The mayor shall forthwith transmit such communication to the city council, and the city council shall forthwith order such hospital accommodations to be provided, and shall make the necessary appropriations therefor."

In Massachusetts it is provided that the hospital for communicable disease shall be within the township limits, but in Michigan and New Jersey it may be otherwise; though in New Jersey,[1]

"when such lands are situate out of the limits of any such incorporated towns as acquire title to the lands, then before using such lands for hospital purposes for persons having contagious diseases, there should be obtained the consent of the township committee or other governing body of the township or other municipality within the limit of which such lands lie and such hospital is erected, that the same may be used for the purpose aforesaid."

In Colorado and Massachusetts[2] no hospital of this kind is to be established within 100 feet of an inhabited dwelling house within an adjoining town without the consent of the town. In New Mexico no pest house is to be established within one mile of an inhabited house. In the District of Columbia a communicable disease hospital may not be within 300 feet of any other building. In California it is forbidden any person to establish or keep a pest house in any city, town or village, and a similar law is found in Montana. In this connection may be mentioned the laws, relics of olden times, which are still found in some states, as Maine, Kansas, Michigan, and Pennsylvania (referring to Philadelphia), and which forbid inoculation with smallpox.

While a hospital for communicable disease may be of great value when used merely by those who voluntarily take advantage of its opportunities, yet to make them really efficient in the prevention of such diseases, it is necessary often to remove to them forcibly persons who would not voluntarily go. Laws authorizing this are found in a large number of states and also in the ordinances of many cities. The earliest form of the law is found in Massachusetts[3] dating back to 1797, and simply gives the board of health authority to remove cases to "a separate house or otherwise." In New York City[4] the board of health "may remove or cause to be removed to a proper place, to be by it designated, any person sick with any contagious, pestilential or infectious disease."

Most of the laws, however, limit the power of removal to those cases in which it can be done without danger to the patient, and it is usually

[1] New Jersey, Public Laws (1895), p. 590.

[2] Massachusetts, Public Statutes, Chapter 80, Sec. 72.

[3] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 40.

[4] New York, Chapter 378 of 1897, Sec. 1170.

provided that if he is not removed, the house in which he remains may be treated as a hospital. In Minnesota when the patient is in a boarding or lodging house, crowded room, vessel or car he may be removed by force. In Atlanta a patient with scarlet fever shall not be removed to the hospital unless isolation is impracticable at home.[1] In Pennsylvania cities of the second class[2] the officers appointed for that purpose are to remove to the hospital all persons sick with infectious disease, but only with the consent of the attending physician. In Bridgeport[3] the removal to the hospital shall be made only when the attending physician, if there is one, shall certify in writing that the removal of such person is necessary for the preservation of the public health. When a patient is allowed to remain at home, in order to ensure the maintenance of isolation, authority is often given to place guards about the house, thus to ensure control as in a hospital.

In most of the laws authority is given to remove persons "sick" with the prescribed diseases, but in some laws, as those of Maine, Massachusetts, Michigan, and New Hampshire, the law applies to persons "infected," and in Massachusetts "who have recently been infected," and in Bridgeport "who shall be suspected of being infected." In most of the statutes the board of health alone is given the power to cause removal to a hospital, but in Wilmington, Del., two-thirds of the board are necessary. Some of the ordinances give the power to other officers. Thus in Chicago, Denver, Omaha, and St. Louis it is the health commissioner, in Philadelphia, the assistant medical inspector, in Newark and Yonkers the health officer.

When communicable disease occurs in a penal institution, it was feared that there might be a conflict of authority between the sanitary and other officials, and special provision has in several states been made for such cases. The Massachusetts law[4] has been in substance followed by Colorado, Maine, Michigan, Mississippi, and Washington. The succeeding section provides that the presiding officer of the board of health

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[1] Atlanta, Rules and Regulations of Board of Health, Sec. 151.

[2] Pennsylvania, Chapter 258 of 1895, Sec. 26.

[3] Bridgeport, Ordinances (1892), Chapter 14, Sec. 3.

[4] Massachusetts, Public Statutes (1882), Chapter 80, Sec. 49:

"When a person confined in a common jail, house of correction or workhouse, has a disease which, in the opinion of the physician of the board, or of such other physician as it may consult, is dangerous to the safety and health of other prisoners or of the inhabitants of the town, the board shall by its order in writing direct the removal of such person to some hospital or other place of safety, there to be provided for and securely kept so as to prevent his escape until its further order. If such person recovers from the disease, he shall be returned to said prison or other place of confinement."

shall report his action to the court. The Massachusetts law also forbids any city or town officer to send to the state almshouse any person suffering with a disease dangerous to the public health.[1]

While municipalities generally have ample authority to establish and maintain hospitals for the care of communicable diseases, and may remove patients to them by force if necessary, yet such hospitals have not been very generally established even in our larger cities. In this respect the towns of the United States are far behind those of England. Provision is made for smallpox much oftener than for the other communicable diseases because public opinion is very decided about the desirability of removing this disease to a hospital. Yellow fever is another disease in which isolation is demanded by the public, but as it usually occurs at the south, and during warm weather, tent treatment is very generally employed and there is less need of permanent hospital buildings than at the north. Most of the larger cities are provided with some sort of a hospital for the reception of smallpox patients, and indeed a considerable number of quite small places have such hospitals; but some large cities are not so provided. Thus there is no such provision at Omaha, Albany, Portland, Ore., and in 1899 Columbus and Fall River were caught by an outbreak and were obliged to hurriedly erect hospitals, and not long since, Reading and Harrisburgh passed through a similar experience.

Many of the smallpox hospitals are popularly and even officially known as "pest houses," and the name from one point of view is not a bad one. It is, perhaps, the rule to find these pest houses utterly unadapted for the use to which they are put. Every hospital should be cheerful, sunny, comfortable, well heated and ventilated, and provided with a plentiful water supply. For communicable disease hospitals it is particularly desirable that everything shall be as attractive as possible, in order that patients may willingly go to them. Too many of these hospitals are lacking in all these qualities. The typical pest house is located in a desolate out of the way place. It can be reached only by a considerable journey over a bad and seldom travelled road. It is often old, and consists of a small low shed-like structure with a few poorly arranged rooms, or perhaps, a single room. It is not plastered, and has no cellar, and is heated, or not heated, by a stove. The water supply is obtained from an out of door pump, and the plumbing consists of an iron sink. The furniture usually corresponds. That the picture is not exaggerated, the writer knows, for he has spent a long winter night with a smallpox patient in just such a building. The following figure illustrates one of these buildings:

[1] Massachusetts, Public Statutes (1882), Chapter 86, Sec. 25.

FIG. 47.

Smallpox Hospital at Lincoln, R. I.. A town of 10,000 inhabitants.

It is not to be wondered at that patients and their friends resort to every deception to conceal the disease, in order that they may not be carried to such a place. Some of these buildings were put up by committees of citizens long before the establishment of boards of health. They have remained because they have been so rarely used that the importance of better things has not been realized. As a rule only the poor are carried to them, and they have not influence enough to cause a change. If a well-to-do patient is carried to one, as happened in the District of Columbia not long since, when an official in the Department of the Interior was attacked with smallpox, a new building speedily results. Excellent hospitals for smallpox are now to be found in Chicago, Cincinnati, Cleveland, the District of Columbia, Milwaukee, and a number of other cities. It is to be hoped that the day of the pest house is waning.

The location of a smallpox hospital is often a matter of some difficulty. Usually it is located in the outskirts of the city and sometimes in a neighboring community. In New York and Boston it is upon an island. In Providence it is on a point projecting into the harbor and entirely isolated, except in hot weather when the adjoining grounds are used as a pleasure resort. In St. Louis it is twelve miles up the river and can be reached only over a most execrable road, and in Cleveland it is quite inaccessible. The plans and elevation of some of these hospitals are here shown.

FIG. 48.

Isolation Hospital (smallpox), Chicago. Built in 1896. Cost of building proper, $82,857.12; laundry machinery, $1,735; heating apparatus, $9,727; plumbing, $1,511; electrical wiring, $1,752; miscellaneous items (including cost of barn, fence around ten acres of ground and extras), $17,701. A description of the hospital may be found in the Report of the Health Department for 1896, p. 127 *et seq.* The plates for these illustrations were loaned by the Commissioner of Health of Chicago.

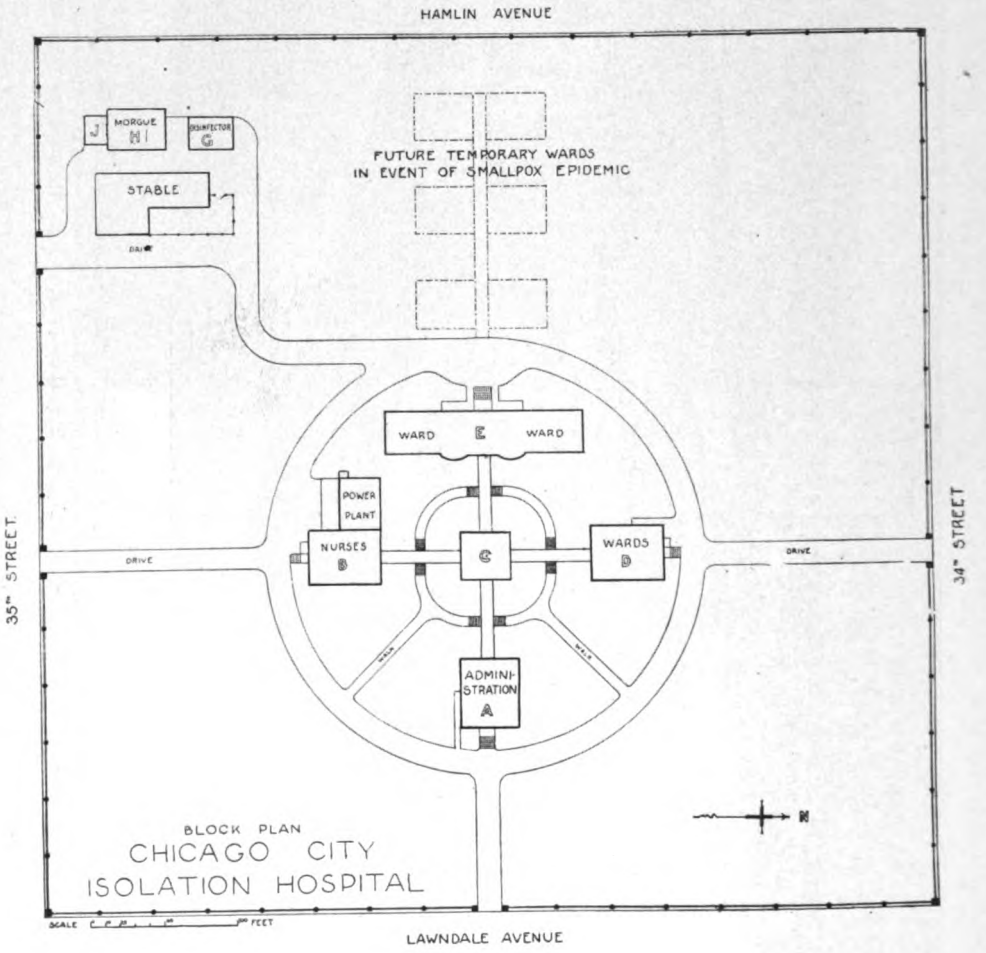
HAMLIN AVENUE
MORGUE
M
DISINFECTOR
G
J
STABLE
FUTURE TEMPORARY WARDS
IN EVENT OF SMALLPOX EPIDEMIC
WARD E WARD
POWER PLANT
NURSES B
C
WARDS D
DRIVE
DRIVE
ADMINISTRATION A
35th STREET
34th STREET
BLOCK PLAN
CHICAGO CITY
ISOLATION HOSPITAL
SCALE
FEET
LAWNDALE AVENUE

Fig. 49.

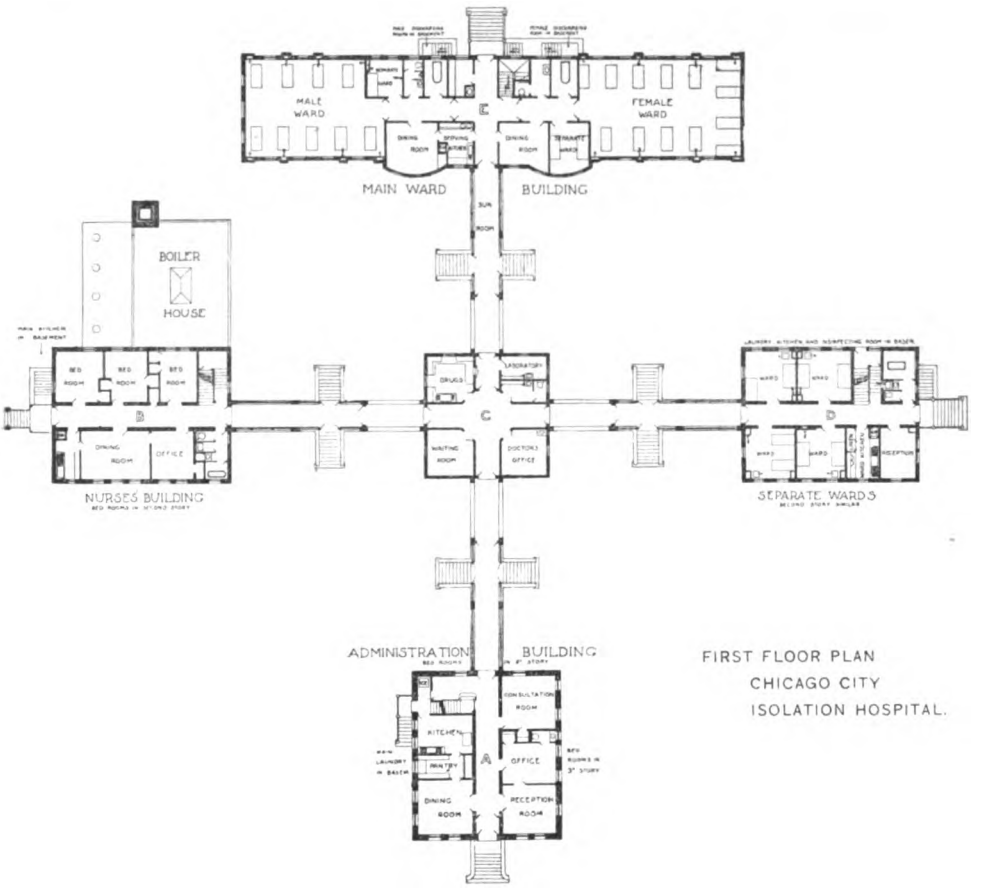
MALE WARD
FEMALE WARD
MAIN WARD BUILDING
BOILER HOUSE
NURSES BUILDING
DRUGS
LABORATORY
WAITING ROOM
DOCTOR'S OFFICE
SEPARATE WARDS
ADMINISTRATION BUILDING
KITCHEN
PANTRY
DINING ROOM
OFFICE
RECEPTION ROOM
CONSULTATION ROOM
FIRST FLOOR PLAN
CHICAGO CITY
ISOLATION HOSPITAL.

FIG. 50.

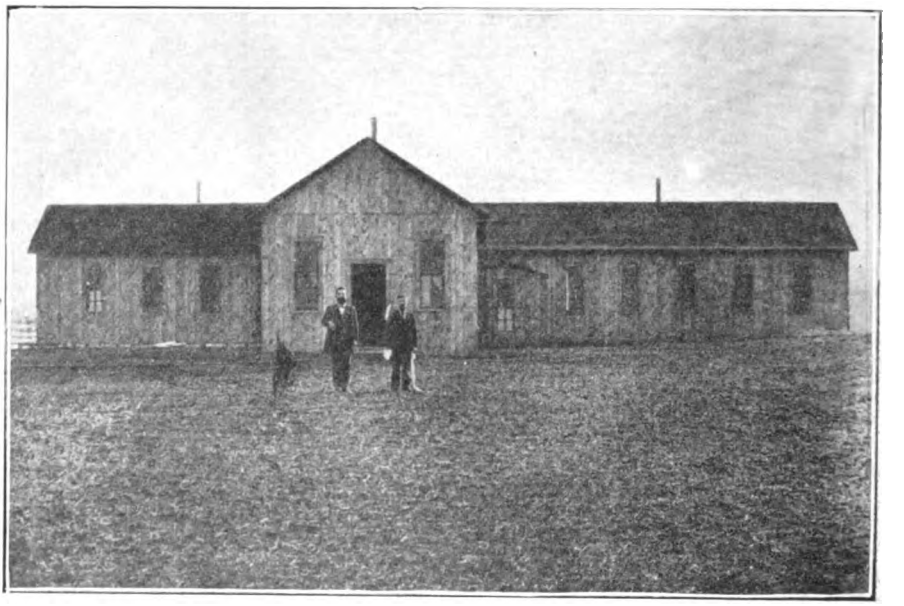

FIG. 51.

Smallpox Hospital at Muncie, Ind., built in 1893, at a cost of about $1,000. From Report of Indiana State Board of Health, 1893.

In New Orleans the city does not maintain the smallpox hospital, but patients are cared for by contract at the rate of $3,000 a year up to fifty patients, and $25 per patient for all in excess of that number.

Next to smallpox in importance as requiring hospital accommodations are diphtheria and scarlet fever. Of course measles, chicken pox, whooping cough, typhus, and other diseases do sometimes require hospital attention but it is only in the largest cities that provision for several diseases is absolutely necessary. The most pressing need is for the treatment of diphtheria and scarlet fever, but by far too many cities have no municipal hospital for these diseases.[1]

It is rare indeed that the health officials are to be blamed for the absence of hospital facilities. Nearly every health report from the cities mentioned clearly sets forth the need of such a hospital and urges the council to make the necessary appropriation. The council however remains apathetic till after a time some prominent person is endangered by the absence of proper facilities when the hospital is at once erected.

[1] Among such cities may be mentioned: Buffalo, Chicago, Cincinnati, Cleveland, Dayton, Fall River, Fitchburg, Haverhill, Lowell, Oakland, Cal., Pittsburgh, Portland, Rochester, Sacramento, St. Paul, San Antonio, San Francisco, Seattle, Somerville, Taunton, and Toledo.

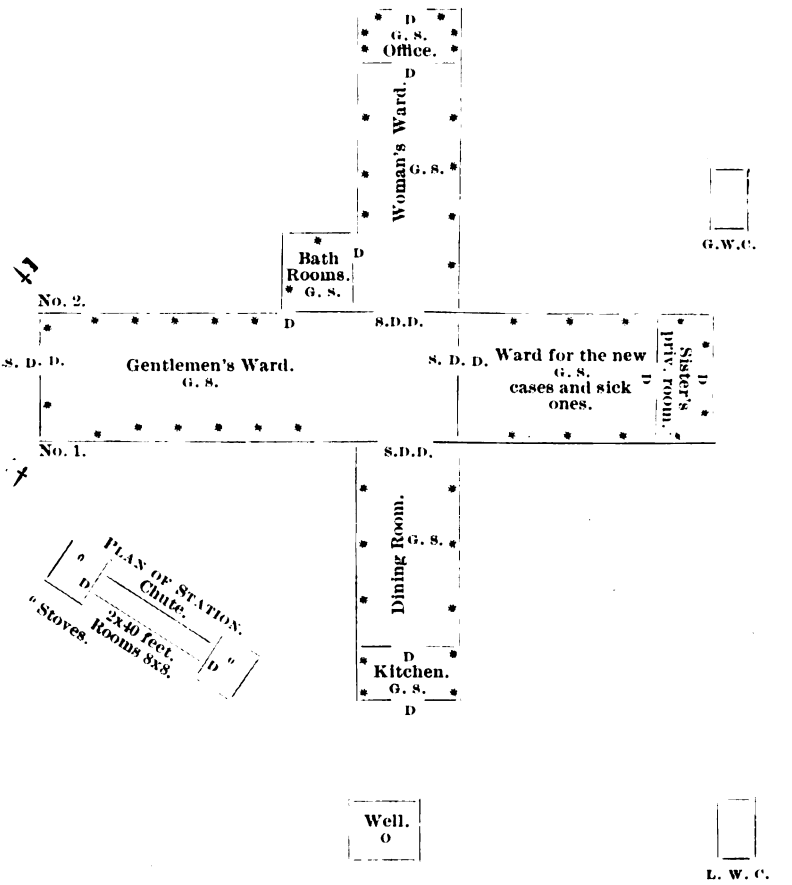

FIG. 52.

Plan of Hospital at Muncie, Ind.

Explanations.—Each arm of this cross was 107 feet long and 18 feet wide.

Arrow No. 2 indicates the direction of guard-house, 200 feet from hospital. It was 8 x 5, provided with a stove.

Arrow No. 1 indicates the direction of the disinfection station, 200 feet from hospital.

D indicates common doors.

S. D. D. indicates sliding double doors.

* * * indicates windows.

G. S. indicates gas stoves.

L. W. C. indicates ladies' water closet.

G. W. C. indicates gentlemen's water closet.

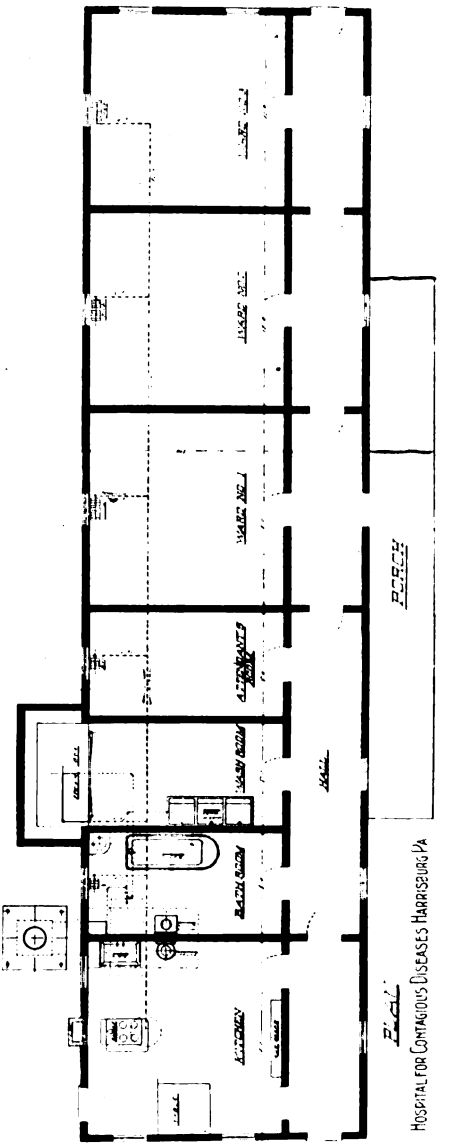

FIG. 53.

Smallpox Hospital at Harrisburg, built in thirty days at a cost of $4,420.05. From Report of State Board of Health of Pennsylvania, 1905, p. 382.

Then there are some cities which have no municipal hospitals for the care of communicable diseases but send such cases to private institutions to which are paid a certain amount per patient, or a lump sum annually. This method is not usually satisfactory to the sanitary officials for several reasons. First, it greatly facilitates dealings with the family of the sick, and often prevents much friction, if the management of the patients is controlled by the same health officials who send the patients to the hospitals. In private hospitals there is of course no such control. Second, if regular board is paid for each patient, there is a tendency for health officials to economize by not sending as many patients to the hospitals as they might otherwise do. Lastly, the facilities for the care of the patients especially as regards isolation are not usually as good in private hospitals, or in fact in any general hospital as they are in hospitals designed especially for that purpose. The following shows some of the cities which have only the facilities above referred to, the amount paid for the service and the hospital to which the patients are sent:

Buffalo	Buffalo General Hospital	$4	per week
Cambridge	Cambridge Hospital	20	per week
Chicago	Cook County Hospital (paupers only)		no charge
Hartford		3	per week
Hoboken, N. J	St. Mary's (under twelve years)	3	per week
	(over twelve years)	5	per week
Newport, R, I	Newport Hospital	14	per week
Newton, Mass	Newton Hospital	14.67	per week
Pittsburgh	Mercy Hospital	14	per week
Providence	Rhode Island Hospital[1]	15	per week
Rochester		12	per week
Wilmington	County Hospital (paupers only)		no charge
Bloomfield, N. J	Mountainside Hospital	9	per week
Montclair, N. J.	Mountainside Hospital		to
Verona, N. J.	Mountainside Hospital	18	per week

Of the above hospitals those in Cambridge, Newton and Providence have small but fairly well arranged isolated buildings for the care of their communicable disease cases, and in Wilmington, Del., the county hospital is said to afford good facilities, but in most of the cities the arrangements made are entirely inadequate and comparatively few cases are sent to the hospital. In some instances the wards are in the same building with the general wards. The health department in almost every instance is very desirous for the establishment of an independent hospital.

A few cities which have no real provision for such cases yet occasionally send a patient with scarlet fever or diphtheria to their general

[1] In this city the building was constructed by the Rhode Island Hospital with money appropriated by the city.

hospitals when it happens that the removal of such a patient from the street or railroad car is absolutely necessary. The patient will then be cared for in a small ward or room set apart temporarily or permanently for that purpose. That is almost all that is done in Cincinnati and Louisville and indeed in some of the cities mentioned on the preceeding page. In other cases separate wards are built in connection with the general hospitals to which the city patients are sent. Such separate wards are found in Hartford, Minneapolis, St. Paul and Providence.

Undoubtedly the best arrangement is for the city to build and maintain a separate hospital for the care of communicable disease as this is the surest way to secure complete isolation. There may be no objection to having the building on the grounds of a general hospital, and heat and light may be advantageously furnished from the general plant. The writer however believes that it is unwise to have any other connection if it can be avoided. This is the result of his experience in Providence where the medical attendance and some other service, and the kitchen, are in common for the contagious wards and the general hospital. This opinion is concurred in by the officers of the hospital who only entered into this arrangement as offering the best means available at the time for the care of such cases.

The following places have what are practically independent municipal hospitals for the care of communicable disease other than smallpox (chiefly diphtheria and scarlet fever): Allegheny, Atlantic City, Asbury Park, in conjunction with the adjoining township of Neptune: Bridgeport, Boston, Brooklyn, Brookline, Denver, District of Columbia, Elizabeth, N. J., Grand Rapids, Mich., Jersey City, Lynn, Memphis, Milwaukee, Morristown, N. J., New York, Paterson, Pittsfield, Mass., Philadelphia, Portland, Me., Spokane, Springfield, Mass., Syracuse, Trenton, N. J., Utica, Waltham and Worcester. Denver and Memphis have a series of cottages or small houses for an isolation hospital: in the latter city there are eight of these cottages and in the former seven. The total capacity of the Denver cottages is forty-six.

Rules for the administration of communicable disease hospitals may be found in the report of the commissioner of health of Milwaukee for the year ending April, 1894, and in the report of the Worcester board of health, for 1896. The cost of maintaining communicable disease hospitals varies as the size of the hospital and the number of patients vary. In Denver in 1898 there were treated seventy-nine cases of diphtheria, twenty-seven of scarlet fever and fifty-four of other diseases, mostly measles, at a cost of $5,800. In Lynn in 1899, fifty-three cases of diphtheria and seventeen of scarlet fever were treated at an ex-

pense of $4,878.01. In Paterson in 1898, 102 patients and eighteen well mothers who went with their children cost $5,097.93, including repairs and the payment of $300 to the attending physician. In Brookline, Mass., in 1899, sixty-eight cases of diphtheria and twenty-one of scarlet fever cost $4,113.39. The cost of running the dwelling which was seized for a hospital in Cambridge in 1899 was $265.60 per week, and during December twenty-eight patients were treated there. In Boston in 1898, 1,517 patients were treated at the Boston City Hospital, contagious division, at a cost of $71,687.34. In Springfield, Mass., in 1900, thirty-seven patients were cared for at an expense of $2,500. In Worcester in 1899 203 patients cost about $7,000.

Municipal hospitals for communicable disease are designed primarily for the use of the poor or persons of moderate means, whose homes are not ample enough for the proper isolation of the sick. It is true that private rooms are usually added to the hospital which may be hired by persons of more means, but who, for one reason or another, desire to make use of the facilities for isolation afforded by a hospital. Municipal hospitals do not ordinarily need to offer all the luxuries which the rich would have in their own homes, and it has been deemed advisable, at least in New York City, to establish a hospital which would more nearly fulfill the demands of wealthy people. The Minturn Hospital for scarlet fever and diphtheria was built in 1896, by private subscription, though upon land owned by the city and near to the municipal hospital used for the same diseases. A similar hospital is proposed for Philadelphia.

One serious difficulty which is usually encountered in providing hospitals for the care of communicable diseases is the securing of the necessary site. The public is much more apt to be frightened by imaginary than by the real dangers of communicable diseases. There is no reason why a contagious disease hospital should not be so conducted that there would be no danger in having it in the midst of a built up block; indeed it ought always to be conducted in just that manner; but the public are afraid of it, and want it in the middle of a ten acre lot, and that far away from all habitations. There is of course great difficulty in securing such a location, and it is unfortunate to place a hospital so far out in the suburbs that every patient has to have a long ambulance ride. Sometimes the opposition to the location of the hospital takes the form of an appeal to the council by which the appropriation is defeated, and sometimes by an appeal to the courts resulting in an injunction. In the District of Columbia such objection was made in 1895 to the location of a contagious hospital that Congress was induced to enact that no such hospital should be built within 300 feet of any building owned by a private individual or any other party than the one erecting the building. As the health

officer of the district has shown, this would require a fifteen acre lot for the hospital, which would make it far too expensive. Finally Congress forced the building of the new contagious wards on the grounds of two private hospitals, threatening to refuse further appropriation for their support unless this was done. This is often the best solution of the site problem, for, provided the contagious ward is separate and has an entirely independent service, there can be no possible danger to the general wards. Often the contagious hospital can be so placed without exciting any opposition, and again it can be so placed nothwithstanding opposition. A number of illustrations are given of communicable disease hospitals with plans and cost of construction.

Some of the large cities have good hospital facilities for the care of communicable diseases, notable among which are New York, Brooklyn, Philadelphia, Boston and the District of Columbia. In New York, Boston and the District of Columbia brick buildings of considerable size are provided while in Brooklyn and Philadelphia one story wooden pavilions are made use of. In Boston nearly $300,000 was expended on the buildings for communicable diseases which are under the management of the city hospital. A plan of these buildings is shown in Fig. 55. In the District of Columbia less extensive buildings but yet structures built of brick and well planned are worthy of study of all who contemplate building hospitals of that character.

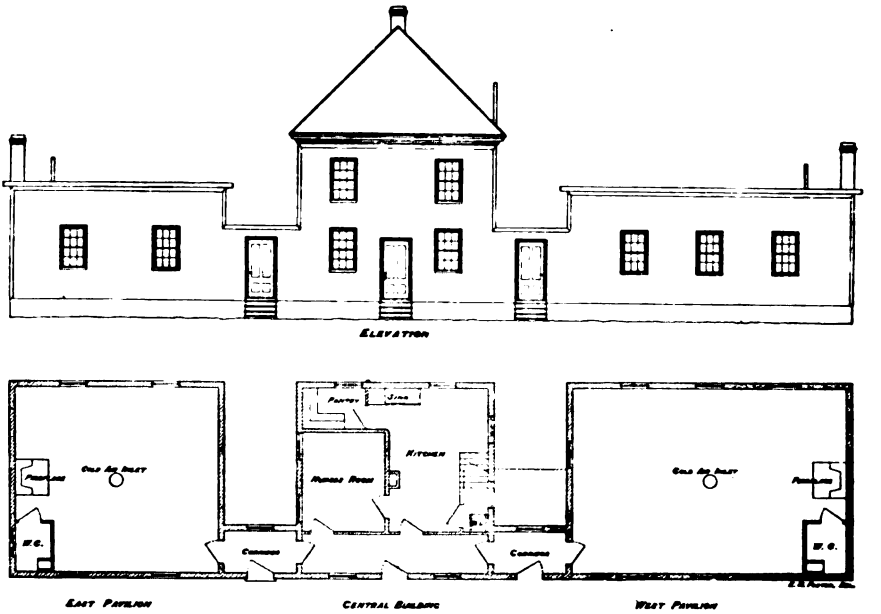

FIG. 54.

Isolation Hospital, Portland, Me. Cost, $2,150. A much more commodious hospital is now under construction.

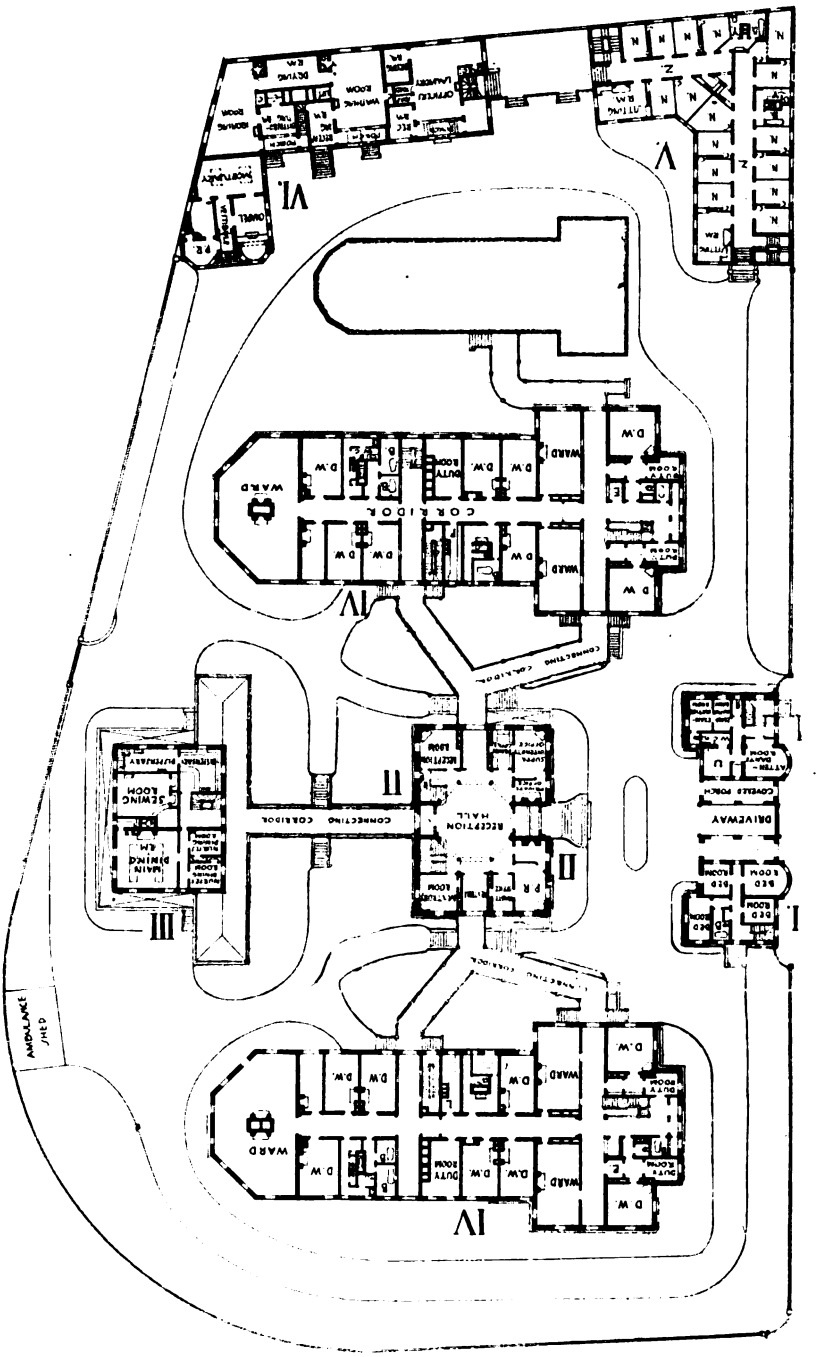

FIG. 55.

Plan of Contagious Division, Boston City Hospital. From Report of the Trustees.

FIG. 50.

City of Worcester Hospital for Contagious Diseases. Coal, with furnishings and sterilizer, $40,000. From electrotype loaned by the Worcester Board of Health.

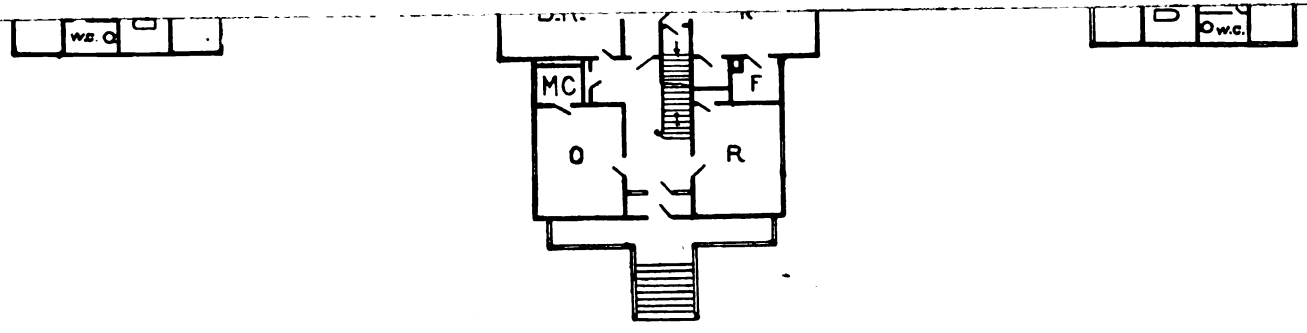

FIG. 57.

Plan of the Worcester Hospital for Communicable Diseases. From electrotype loaned by the Worcester Board of Health.

[illegible] Hospital, Brookline, Mass. Cost, $6,000. From an electrotype loaned by the Agent of the Board of Health.

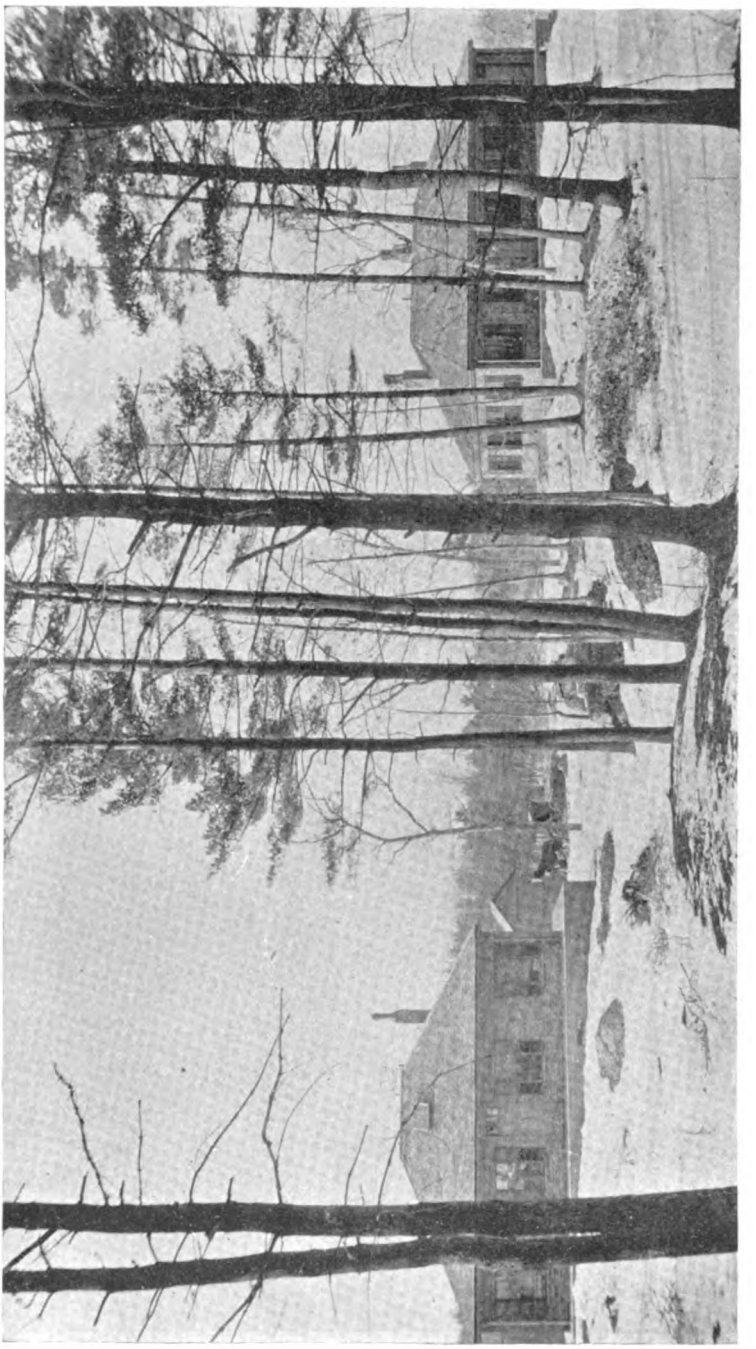

FIG. 58.

Isolation Hospitals, Brookline, Mass. Cost, $5,000. From an electrotype loaned by the Agent of the Board of Health.

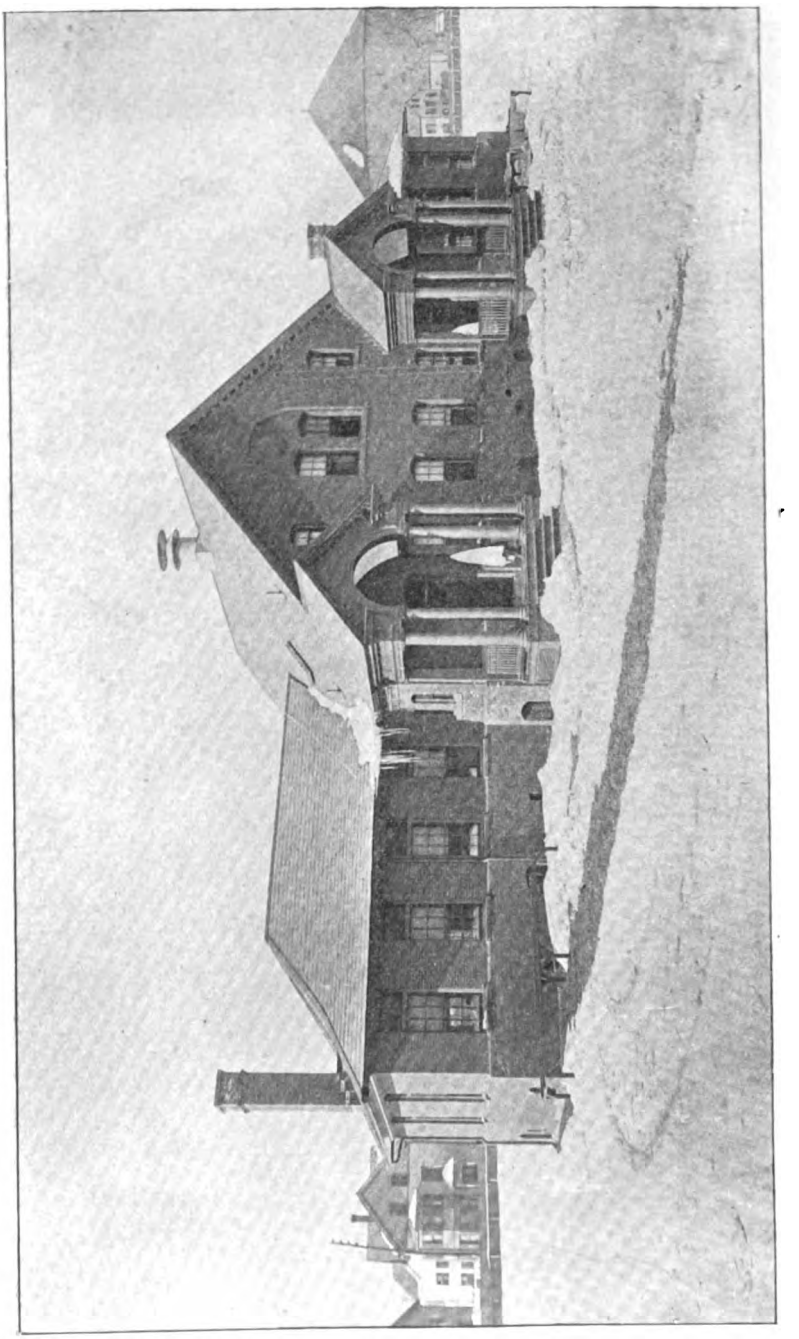

FIG. 59.

Wards for Scarlet Fever and Diphtheria, built by the City of Providence at the Rhode Island Hospital. Cost, with furnishings, $21,906.81.

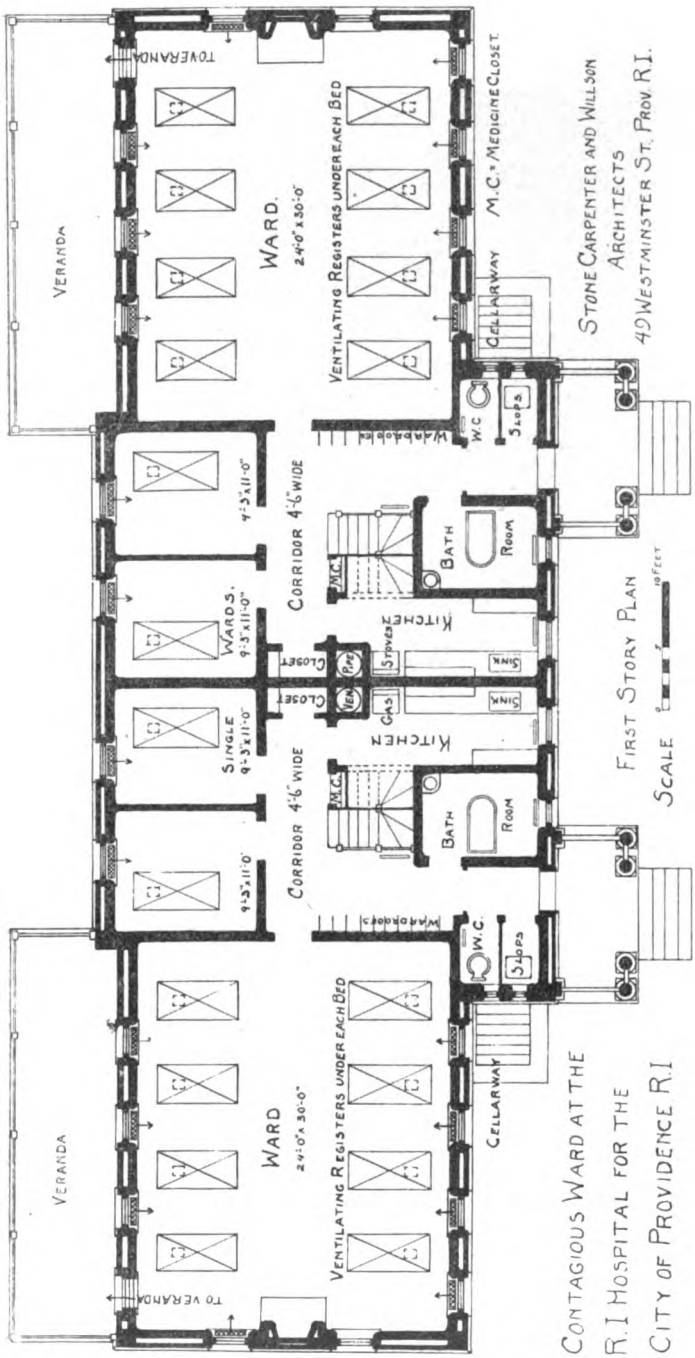

FIG. 60.

Plan of Hospital Wards for Scarlet Fever and Diphtheria, Providence.

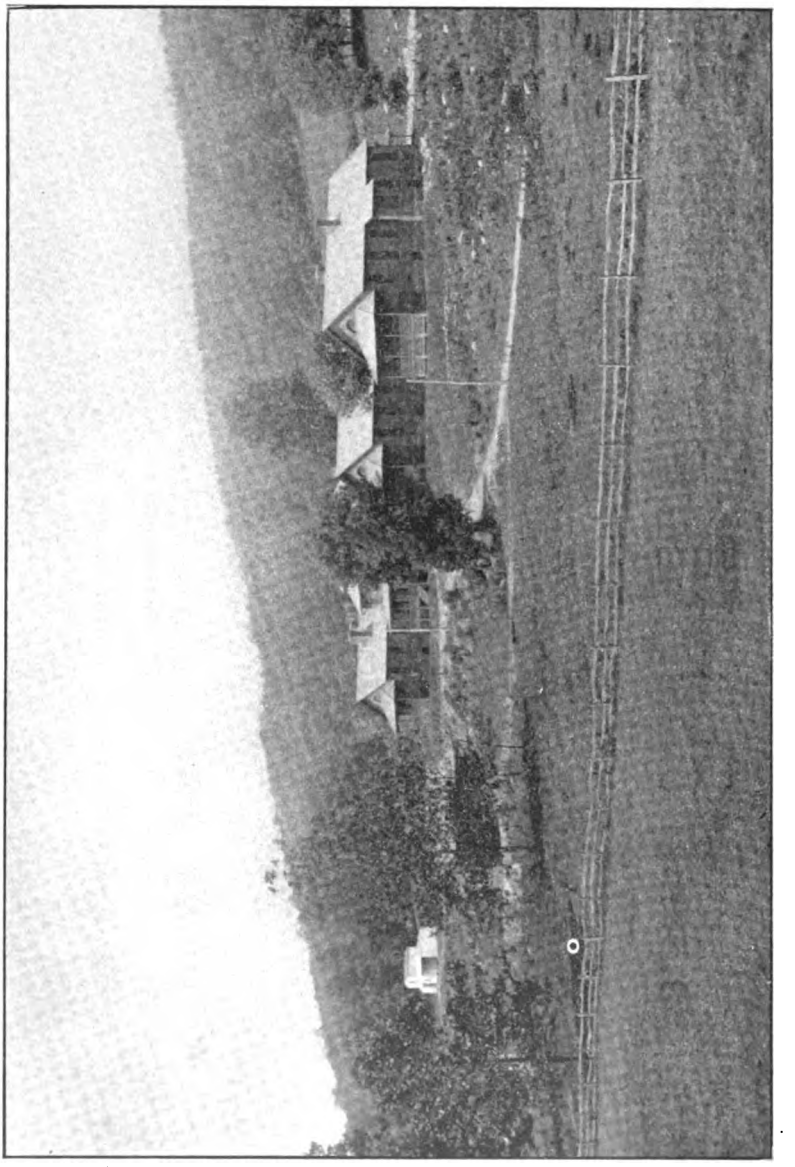

Fig. 61.

Isolation Hospital, Paterson. (Cost, $26,500. From electrotype loaned by the Health Officer.

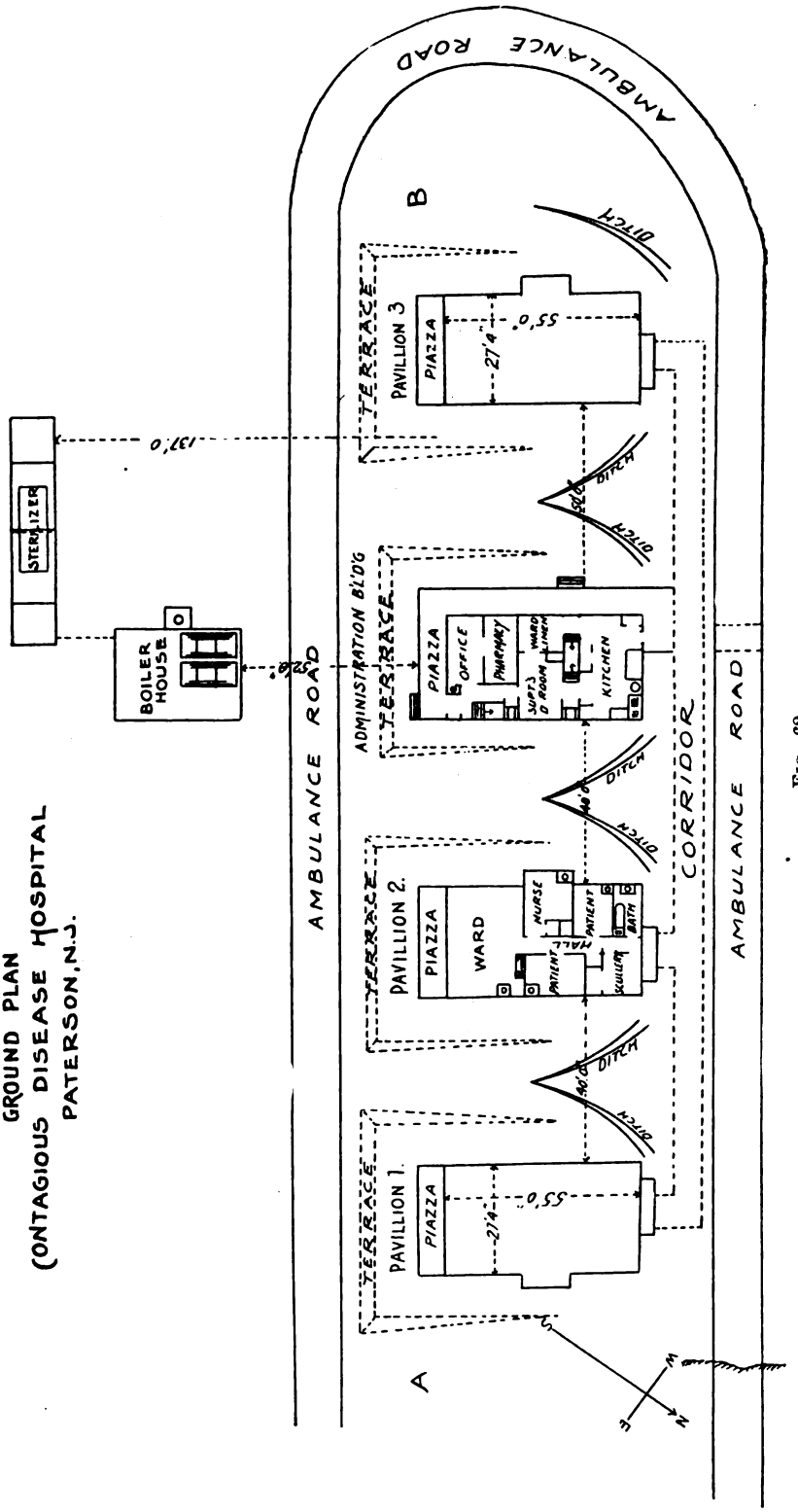

FIG. 62.

Ground Plan of Isolation Hospital, Paterson. From electrotype loaned by the Health Officer.

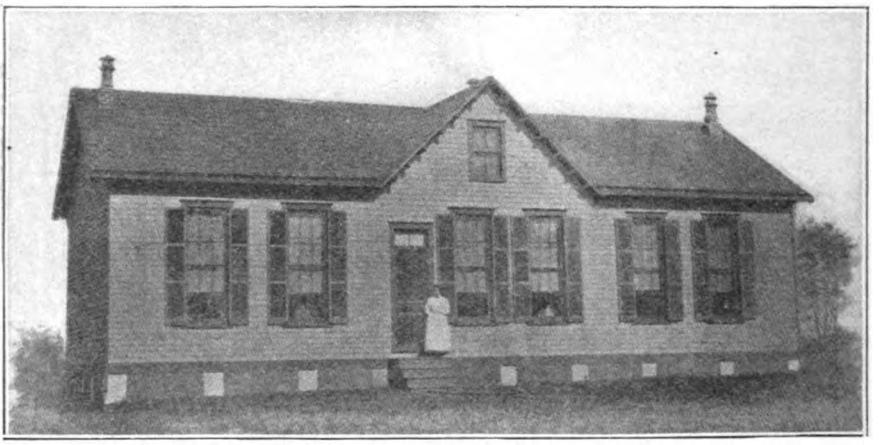

FIG. 63.

Communicable Disease Hospital, Trenton. Cost of building, $2,449.51; furnishings, $400.31. From Report of State Board of Health of New Jersey, 1896.

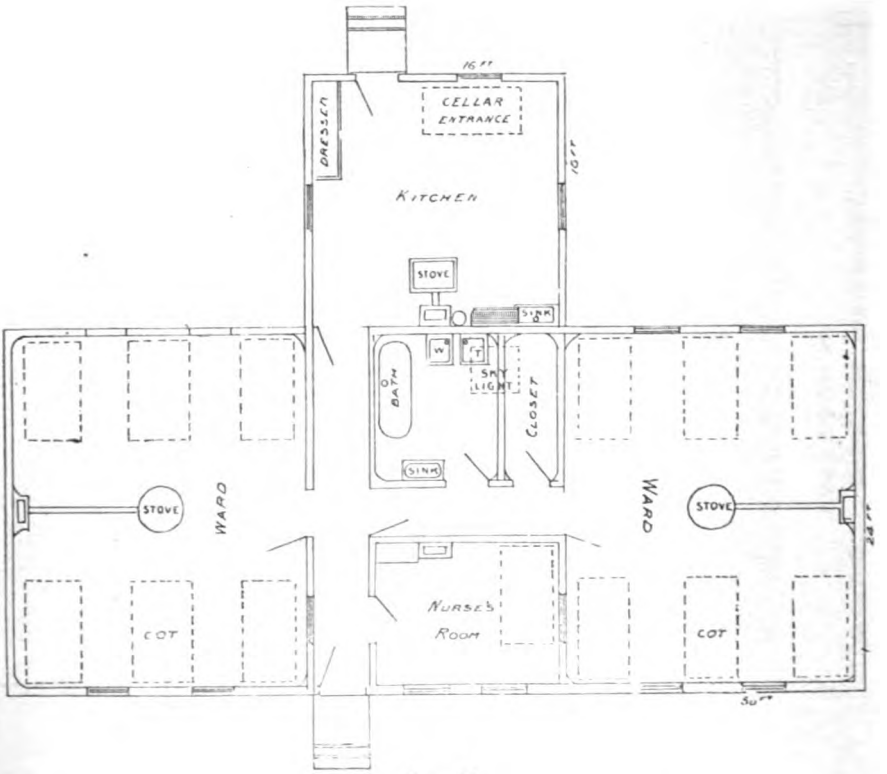

FIG. 64.

Plan of Communicable Disease Hospital, Trenton.

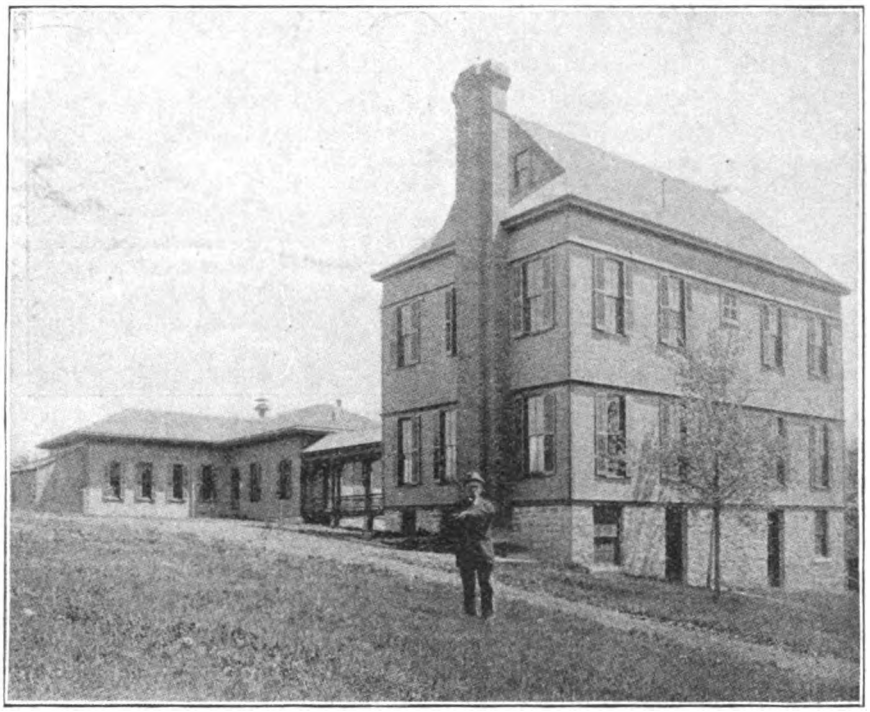

FIG. 65.

Hospital for Communicable Diseases, Syracuse. House purchased and remodeled and ward added. Changes cost $11,145.57. From Report of Health Officer, 1896.

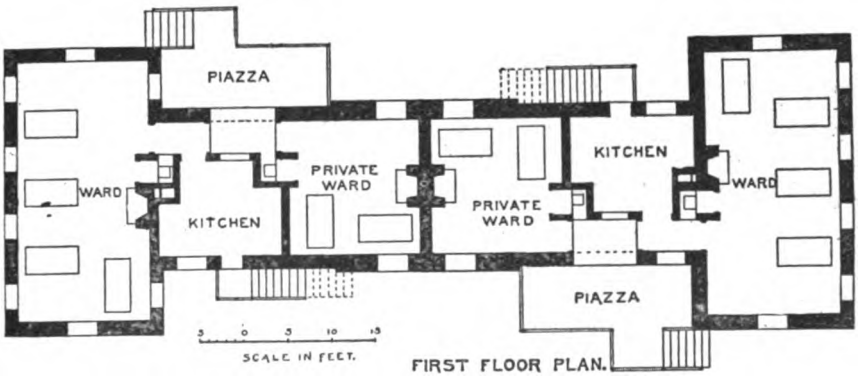

FIG. 66.

Plan of the Communicable Disease Wards at the Cambridge Hospital. From Report of the State Board of Health of Massachusetts, 1893.

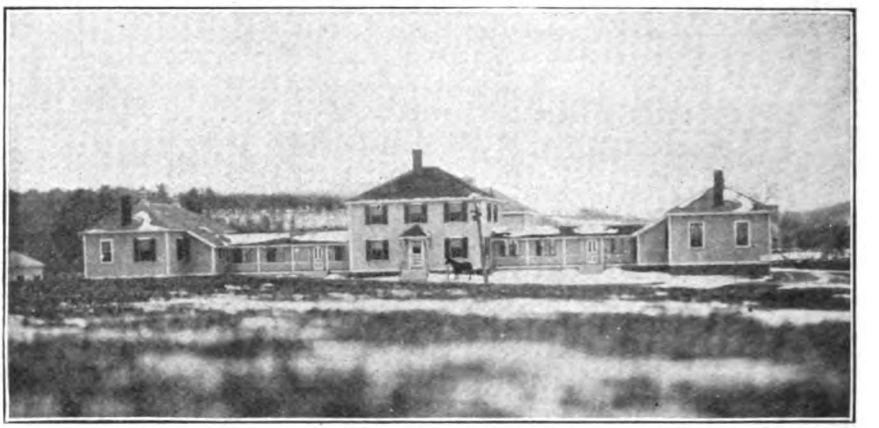

FIG. 67.

Hospital for Communicable Diseases, Lynn. Cost, $5,500.

AMBULANCES.

If a hospital is provided for the care of communicable diseases it is very necessary that some suitable vehicle should be provided to transport patients to it. Patients with scarlet fever and diphtheria should not be carried in hacks or any other public conveyance; neither is it proper to carry such cases in an ambulance used for general purposes. A city or town which maintains a "pest house," and there are still many such, probably has no ambulance, but trusts to luck in hiring some old express wagon whenever smallpox chances to appear. If a city has sufficient intelligence to provide a decent hospital for the commoner communicable diseases, some sort of ambulance is usually provided to be used exclusively for such cases. Yet the writer knows of a city of 100,000 inhabitants which built a contagious hospital at a cost of $25,000 and then hired by the hour an undertaker's wagon to remove patients to it. Another city of even larger size carries its communicable disease patients in its general ambulance.

The following account of the ambulance service for the smallpox hospital in St. Louis is by the superintendent:[1]

"I have seen no later than a year ago, a patient brought to this institution in what was at one time an ambulance; but from the appearance it presented at the time referred to, it had evidently been used as a chicken roost, so full of chicken dirt was it. In this so-called ambulance there was not even a pillow, not a blanket, in fact nothing, not even a seat, unless the patient chose the floor; fortunately the patient was not very sick at the time, so he managed to balance himself on the end gate of the wagon for fifteen miles."

[1] St. Louis, Report of Health Commissioner (1896–7), p. 179.

In providing an ambulance for communicable diseases three things should be borne in mind. First, the ambulance should be so constructed that it may be easily disinfected, and second, it should, if possible, be so arranged that patients may sit up in it, as many persons are perfectly able, and prefer to ride in that way; third, it should not be forbidding in appearance.

Doubtless other cities have a special ambulance for communicable disease, but the following is a list of some which are shown by their health reports to be so provided. Brookline, Mass., District of Columbia, Cambridge, Trenton, Grand Rapids, Milwaukee, Minneapolis, New Haven, Charleston, New York City, Utica, Philadelphia, Boston, Brooklyn, Providence, Buffalo, Taunton, Trenton, Newton, Mass., Paterson, Lynn, Chicago and Pittsburgh.

In New York City, Chicago and Utica cabs are used for conveying many contagious cases. In Newton a rockaway lined with rubber is employed.

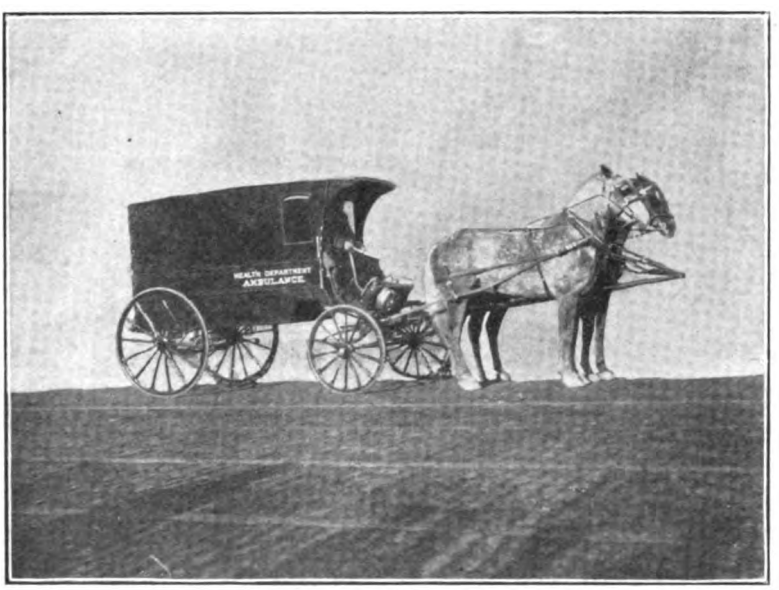

FIG. 68.

Ambulance for Communicable Diseases, Providence. Cost, $500.

Ambulances should be disinfected after each use, but this is in many cities not done. The ambulance is simply kept clean and washed out occasionally with corrosive sublimate or sprayed with formalin, as in Minneapolis, St. Paul and Providence, or, in one city at least, fumigated

with sulphur. All cities, however, change the blankets and movable bedding after each trip and wash it or steam it. In Boston and Cambridge a rubber covered mattress is used which is washed with bichloride after each trip.

An ambulance should be in readiness to respond promptly to all calls, but in small cities where the calls are infrequent it is not feasible to do this in all cases. Thus in Paterson, although the city has a hospital and an ambulance it owns no horse, and one has to be hired for each occasion. In large cities like New York and Boston of course the ambulance is kept ready to respond at a moment's notice. There appears to be no rule in regard to the attendance of a physician on the ambulance. One goes with every trip in New York but not in Boston. In Boston a ward attendant in a white duck suit accompanies the driver. In Providence a physician goes only in severe cases. The driver wears a long linen duster over his ordinary suit.

QUARANTINE.

The word quarantine is used with varying significance in sanitary literature. The term was originally applied to the detention of a vessel having on board communicable disease: but it has come to be applied to any restriction placed upon the communication of infected with uninfected persons or things. In the opinion of the writer it would be well to restrict this use of the word to the interference with communication between infected and uninfected localities, countries, states, towns, villages, etc. The detention of an individual in a house or hospital is a matter requiring such totally different procedure that it is well to designate it by another term, such as isolation.

Quarantine also has two natural divisions, maritime and inland. The conditions of trans-oceanic and coastwise commerce are so different from those of communication on land, or even on inland waters, that it is well to make these divisions of the subject.

Maritime Quarantine.

The first colonial quarantine law was passed in Massachusetts in 1699, and during the next century every colony had laws of this kind on its statute books. Up to the time of the establishment of the national board of health in 1879, maritime quarantine was entirely in the hands of the states which, however, frequently delegated it to the seaports within their borders. The federal government doubtless has authority to maintain quarantine, and it then for the first time attempted to do so. After this board was abolished, quarantine powers were conferred upon

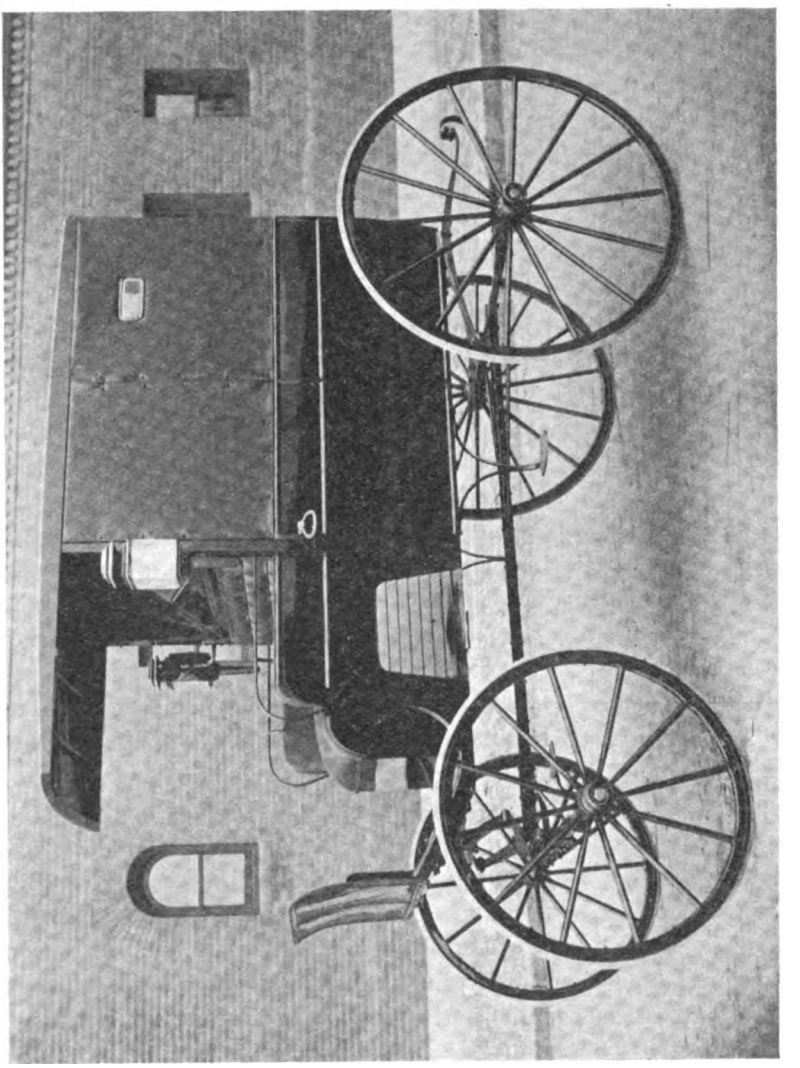

FIG. 69.

Ambulance for Communicable Diseases, Brookline, Mass. Cost, $400. Has seats for patients able to sit up, but will receive an adult on a stretcher. From plate loaned by the Agent of the Board of Health.

the marine hospital service. At present there is very little direct federal legislation in regard to quarantine, but rules have been formulated by the secretary of the treasury which must be obeyed before vessels can enter at the custom house. Local quarantines very generally enforce these rules and also act under state laws and rules of their own. The federal government through the medium of the marine hospital service has established the following quarantine stations: Reedy Island, Delaware Breakwater, Cape Charles, Cape Fear, South Atlantic, Brunswick, Tortugas, Gulf Island, San Diego, San Francisco, and Port Townsend. The rules are promulgated and the stations established in accordance with the Act of Congress approved 15 February, 1893. This act also gives the secretary of the treasury authority to make rules in regard to the procedure of masters and owners at foreign ports and enlists the consular service in the aid of the marine hospital service. Medical officers of this service are also detailed from time to time to infected foreign ports to assist in seeing that infected vessels are not allowed to sail for United States ports.

It is the belief of many and shared by the writer, that maritime quarantine should be exclusively in the hands of the federal government, but at present it is not, and it is existing conditions that are here considered. Most of the quarantines are maintained by local governments while some of the most important are exclusively state organizations. The federal government cannot supersede any of these except on their volition, but it can and does insist on minimum requirements which must be uniform at all ports of entry.

All of the seaboard states have laws in regard to maritime quarantine, but their treatment of the subject varies considerably. In the New England states and Delaware, Georgia, Maryland, New Jersey, and Washington, the administration of quarantine is practically left to local officers, that is, to officers appointed by seaport cities. In all these states except Georgia the board of health or health officer is given quarantine power, but in Georgia this is conferred upon the municipal governments. In the other states the state exercises more or less executive power. In New York the health officer of the port of New York, in most respects the most important quarantine officer in the country, is appointed by the governor. He must be a physician of ten years' experience, skilled in quarantinable diseases, and his term of office is four years. In Pennsylvania the control of quarantine is vested in a state board consisting of a member appointed by the College of Physicians and Surgeons, one by the Maritime Exchange, of the secretary of the state board of health, of the health officer of Philadelphia, of the quarantine physician appointed by the mayor of Philadelphia, and a

member appointed by the governor of Pennsylvania. In Virginia the governor appoints the quarantine officer at Newport News and his term of office is two years; but for the protection of Norfolk and Portsmouth the state has established a board of quarantine commissioners for Elizabeth River, three of whom are appointed by the city council of Norfolk, three by the city council of Portsmouth, and one by the judge of the county court of Norfolk County. In South Carolina the state board of health controls quarantine and the quarantine officers are appointed by the governor. The quarantine officer at Charleston, the chief port, has a salary of $1,800 and is nominiated by the state board of health. In Florida, also, the state board of health has full control of quarantine and the local officers are its agents. When this law went into effect the two counties of Escambia and Franklin were allowed to maintain a separate health and quarantine organization, but this arrangement has recently been abandoned. In Alabama the quarantine of Mobile is administered by a board established by special act and known as the quarantine board of Mobile Bay. It consists of the president of the board of revenue and road commissioners of Mobile County, the mayor and health officer of Mobile, the president of the Chamber of Commerce and the president of the Medical Association of Mobile, and the probate judge and the health officer of Baldwin County. In Mississippi and Louisiana the state board of health has charge of quarantine, and in Texas the state health officer. In Oregon the governor appoints local quarantine officers of whom there are four. In North Carolina the entire quarantine has been transferred to the marine hospital service.

It is thus seen that in New York, South Carolina, Florida, Mississippi, Louisiana, Texas, and Oregon maritime quarantine is directly administered by state officials, while in the other states administration is in the hands of local officials, though sometimes, as at Philadelphia, Elizaabeth River, Va., and Mobile Bay, Ala., a special board is created to be made up of certain of the neighboring officials.

Besides the above evidences of state control, in Maine, New Hampshire, and Alabama the state board of health is authorized to establish quarantine, and if its arrangements are in conflict with local regulations, the latter must give way. In Alabama, Georgia, Louisiana, Maryland, Rhode Island, and Texas the governor also has authority to proclaim quarantine. It is thus seen that while in a considerable number of seaports, including such important ones as Boston, Baltimore, and San Francisco, quarantine is a local affair, yet in the main there is a disposition to consider it a function of the state rather than of the local government.

There is a very considerable amount of statutory legislation in regard to quarantine and also not a few ordinances made by the seaport cities themselves.[1] There are also a good many rules, orders, and proclamations issued under authority by various quarantine officials, all of which go to make up the volume of quarantine legislation. Much of the statutory legislation is very old, dating back to the eighteenth century. Its phraseology is apt to be peculiar and many of its provisions are obsolete. It often, too, deals with details which might well be left to the quarantine officer. Many of these acts sadly need revision.

Several of the states in the interior lying upon navigable lakes or rivers, have copied some of the quarantine provisions of the seaboard states in regard to the detention of vessels. Among such are Kentucky, Ohio, West Virginia, Michigan, and also the cities of Chicago and St. Louis, but the conditions are so different from what prevails on the sea coast that these regulations rather belong to the subject of inland quarantine. Among the subjects covered by quarantine legislation are the following:

Authority to declare quarantine. The authority to decide what vessels shall be detained and to order them into quarantine is sometimes conferred upon the governor, as in Alabama, Georgia, Maryland, Rhode Island, Texas and Louisiana, and more often upon the state board of health as in Florida, Louisiana, Maine, Massachusetts, New Hampshire, South Carolina, and Texas; but it is usually given to the local authority. This authority is granted in all states except Pennsylvania, Florida, Mississippi, Louisiana and Texas. More rarely the statute attempts to specify the vessels that shall be subject to quarantine. This is more often found in the older laws, as those of Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, North Carolina and South Carolina, though it is sometimes found in some of the newer laws. Thus in Connecticut it is every vessel having sickness on board; in Delaware any "vessel having on board more than forty persons, or any one sick with any infectious disease, or coming from any sickly port." Infected vessels or those suspected to be, or vessels from any infected port, are common expressions in statutes and local regulations. In San Francisco in addition to the above, "vessels with decaying cargoes or which have unusually foul or offensive holds" are subject to quarantine. The section given below is an example of a

[1] Among the latter which the writer has examined are those of Bath, Boston, Baltimore, Bangor, Fall River, Gloucester, Jersey City, New York City, Mobile, New Bedford, New Haven, Newport, Philadelphia, Providence, Provincetown, San Francisco, and Wilmington, Del.

modern and specific statutory declaration of quarantine.[1] An example of a governor's proclamation of quarantine, that of the governor of Texas may be found on page 847, *Public Health Reports*, United States marine hospital service 1900. Many, if not most of the definitions as to what vessels are subject to quarantine are found in local regulations, and this subject will be further considered in connection with quarantine administration.

Authority to make rules in regard to quarantine is conferred upon the state sanitary officials in South Carolina, Florida, Alabama, Mississippi, Louisiana, and upon the governor in Texas; but in most of the states the seaport towns, or the local boards of health, or the quarantine boards have such authority and have very generally taken advantage of it.

The board of health in Charleston can make quarantine rules but only under the direction of the state board of health. In New York the health officer of the port of New York in addition to his other duties and his "control" of quarantine "shall in the presence of imminent danger of which he shall be the judge, take the responsibility of applying such additional measures as may be deemed indispensable for the protection of the public health."[2]

Provisions are sometimes made for the publication of these regulations. In Rhode Island they must "be published in one or more newspapers, published in the state within or nearest the town wherein" they were adopted. In Alabama the quarantine board of Mobile Bay is to provide the towboat captains and pilots with rules printed in English, Spanish, German and French, and these officers are to furnish them to the masters of incoming vessels. A similar requirement is made of pilots in Louisiana, Maine, New Hampshire, South Carolina and Washington, and in New Hampshire the town authorities are to notify the commanders of neighboring forts and ask their assistance in notifying vessels to anchor at quarantine.

Duties of Masters. Most of the statutes and nearly all of the local regulations require that vessels subject to quarantine, or infected

[1] New York, Revised Statutes (1896), p. 2446 (Public Health Law, Sec. 110):

"Every vessel arriving at the port of New York from any place where a quarantinable disease existed at the time of departure, or which shall have arrived at any such place and proceeded therefrom to New York, or on board of which during the voyage any case of any such disease shall have occurred, shall remain at quarantine until the health officer grants a permit for the discharge of such vessel or cargo or both. Every vessel arriving at the port of New York from any foreign port, and every vessel from a domestic port (in the ordinary passage from which they pass south of Cape Henlopen, arriving between the first day of May and the first day of Novem ber), shall . . . be subject to visitation."

[2] New York, Revised Statutes (1896), Public Health Law, Sec. 101.

vessels, or vessels from infected ports, or other specified classes of vessels, shall come to anchor at the quarantine grounds, or as close to the quarantine grounds as possible, or as soon as a safe berth can be reached. In Rhode Island where provision is made for the appointment of a sentinel, the master is liable only when he refuses to anchor after being hailed.

Some of the states, as New Hampshire, North Carolina, and Washington, require the master to report to the quarantine officer or other local authorities if his vessel is infected. In New Hampshire he is to report if any person on board is or has been sick with any infectious disease, or if there are any goods on board which may be infected. Most of the state laws require the master to give to the quarantine officer information desired by the officer. Sometimes the law requires him to make a truthful statement, and in other cases he may be put under oath by the quarantine officials. Sometimes, as in the Massachusetts law which was passed in 1797, seamen and passengers may also be put under oath.[1] In Georgia the master is required to deliver up all his books and papers, and in New York, Florida and Virginia to show his bill of health. Often a general provision is introduced that the master shall conform to all the provisions of the law, and that failure to obey any of them shall subject him to the prescribed penalty.

Duties of Pilots and Towboat Captains. Pilots and the masters of tow boats may be responsible for the failure of a vessel to come to anchor at quarantine, and as these persons are in a position to be well informed as to quarantine rules, and are more easily controlled by the quarantine officers, it often happens that they are by law made responsible for its enforcement. The duties of pilots in notifying masters of vessels of the quarantine regulations has already been alluded to. Their other duties and responsibilities are explicitly set forth in the South Carolina law given below.[2]

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[1] Massachusetts, Revised Statutes (1882), Chapter 80:

"SEC. 63. A master, seaman, or passenger, belonging to a vessel on board of which any infection then is or has lately been, or is suspected to have been, or which has been at or has come from a port where an infectious distemper prevails that may endanger the public health, who refuses to make answer on oath to such questions as may be asked him relating to such infection or distemper by the board of health of the town to which such vessel may come (which oath any member of the board may administer), shall forfeit a sum not exceeding two hundred dollars; and if not able to pay said sum, he shall suffer six months' imprisonment."

[2] South Carolina, Revised Statutes (1893):

"SEC. 1995. It shall be the duty of each pilot belonging to either of the said ports to use his utmost endeavors to hail every vessel he shall discover entering the port, and to interrogate the master of such vessel in reference to all matters necessary to enable such pilot to determine whether, according to the provisions of the

The regulations of Mobile Bay require that pilots and officers and crews of towboats shall not board infected vessels, but shall direct them to the quarantine station, and the pilot on boarding all other vessels must hoist a flag at half mast at the fore until visited by the quarantine officer. In Georgia and South Carolina the pilot must not board an infected vessel. In Louisiana the rules of the state board of health require that pilots are, on boarding, to hand the master a printed form, and the latter shall fill out in writing the names of the crew and passengers, and answer truthfully the questions therein, and return the same with the bill of health to the quarantine officer. Several of the laws stipulate that pilots who have boarded a vessel shall not leave it until a permit is granted. The rules of Providence, Newport, and Louisiana make similar provisions in regard to customs officials, and the San Francisco rules require them to be disinfected and vaccinated as are others. The Louisiana statute specifically forbids the masters of towboats to receive passengers or freight.

Communication with Vessels in Quarantine. The object of placing vessels in quarantine is to prevent disease passing from them to the shore. Hence, prohibition of intercourse between infected vessels and the shore is the most important part of quarantine legislation. Most of the laws provide that no person shall go ashore from a vessel in quarantine without a permit from the quarantine officer; and in Alabama, Georgia, North Carolina, Rhode Island, and Virginia such person may be arrested and returned to the vessel or confined on shore. When the

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preceding sections, such vessel is subject to quarantine or examination by the quarantine officer.

"SEC. 1006. If, from the answers obtained to such inquiries, it shall appear that such vessel is subject to quarantine or examination by the health officer, according to the preceding sections, the pilot shall immediately give notice to the master of the vessel that he, his vessel, his cargo, crew, and passengers are subject to such examination, and that he must proceed and anchor said vessel at the quarantine anchorage, there to await the further directions of the quarantine officer.

"SEC. 1007. It shall be the duty of every pilot who shall conduct into port a vessel subject to quarantine or examination by the health officer —

"1. To bring such vessel to anchor within the buoys marking the quarantine anchorage.

"2. To prevent any vessel or boat from coming alongside of the vessel under his charge, and to prevent anything on board from being transferred to or thrown into any other vessel or boat.

"3. To present to the master of the vessel a printed copy of this chapter when such copy shall have been delivered to him for that purpose.

"4. To take care that no violations of this chapter be committed by any person, and to report such as shall be committed, as soon as may be, to the health officer.

"5. To subject himself to such detention and delay and cleansing and purification as to his person and clothing as shall be prescribed by the health officer after having boarded or brought to the quarantine ground any vessel subject to quarantine.

ship's company is thus confined on board, the master or owners are by the laws of South Carolina and Baltimore, made responsible for their maintenance. It is forbidden in many states to carry goods on shore and very stringent regulations are found in New York,[1] and in New-Hampshire and South Carolina such goods may be seized by the quarantine officers. In New Jersey and in Boston there is a provision against throwing any bedding or clothing from a vessel in quarantine.[2] In New Jersey, and in New York City, rags and hides may not be landed without a special permit.

It is also forbidden persons to go on board vessels in quarantine and in Louisiana, butchers, bakers, stevedores, and runners are named as possible offenders. In North Carolina the master is liable unless he informs the offender that he cannot board. Such persons are also liable to detention on board as long as the quarantine officer deems necessary. In New York any one who has any communication or intercourse with any vessel at quarantine, or with any of the crew or passengers of such vessel, or who enters the quarantine ground or anchorage is liable to the penalty. In South Carolina, Providence, and Newport, boats are not allowed alongside or to pass among vessels at quarantine.

New Hampshire, New Jersey, the City of New York, Rhode Island, and Washington provide that if a vessel leaves quarantine without permit she may be forcibly returned at the owner's expense, the costs to be a lien upon her.

Inspection. Nearly all the statutes and regulations provide for the inspection of vessels at quarantine for the purpose of determining the question of their infection and their subsequent treatment. These laws impose duties both on the masters of vessels and on the quarantine officers. The former are required to submit their vessels to inspection, and as has been shown, are to furnish all needed information and show their books and papers and present their bill of health. The quarantine officer in turn is required to inspect vessels "immediately" or "as soon as possible;" but as a proper inspection cannot be made at night, it is usually directed that it shall be made between sunrise and sunset. Some of the statutes, as those of New York, South Carolina, and Florida go into some detail as to the duties of the quarantine officer in inspection, but usually these matters are left to be incorporated in the local rules governing quarantine.

Care of the Sick. Quarantine officers are generally authorized to remove the sick from the vessel to the shore, in order that they may be the better cared for, and this is usually done, but they also have the

[1] New York, Revised Statutes (1896), p. 2418, (Public Health Law, Sec. 131c.)
New Jersey, Rule 9, State Board of Health, 29 June, 1897.

option of confining them on the vessel. In Louisiana the state board of health is required to have nurses and physicians on call at all times, and in Texas the state quarantine officers are to provide for all persons held in quarantine. Usually, however, the laws, especially the older ones, require that the cost of caring for the sick shall be a charge upon the vessel.

Disinfection. Quarantine officers are usually authorized to disinfect or order the disinfection of infected vessels and their cargoes, and also the ship's company. The New York statute is very explicit as to what may be done. Usually, however, the details of disinfection are left to the local officer. It is usually provided that the cost of disinfection shall be paid by the vessel; and sometimes as in New York, the fee to be charged for this service is fixed by statute.

Vaccination. Several of the states as New York, New Jersey, and South Carolina provide for the vaccination of all persons on board who have not been previously protected against smallpox. In New York if they refuse to submit to examination or vaccination, they are to be detained at the expense of the ship for the period of incubation of smallpox.

Expenses of Quarantine. Most of the older laws provide that all the expenses of quarantine such as moving vessels, furnishing the crew with subsistence, caring for the sick, etc., shall be paid by the vessel, and shall be a lien upon it or upon the cargo.

Fees. It is usually provided by law that fees shall be charged for the inspection of vessels at quarantine and the issuing of permits and other services, and these fees are generally fixed by statute. In some ports, however, no fees are charged as will be noted in the following pages.

Penalties. The penalties provided for the violation of quarantine laws are more severe than are found in other sanitary laws, those for the adulteration of food only approaching them. A common maximum is $500. In Louisiana, South Carolina, and New York the maximum is $2,000 or twelve months imprisonment for any violation of quarantine regulations by masters, or for unloading goods. In Georgia the penalty for an infected person entering the state is $500 and imprisonment.

Quarantine Administration.

Vessels subject to Inspection and Quarantine. The determination of liability to quarantine rests on federal regulations, state laws, and local rules. The older state laws, many of which are still in force, required the quarantine of all vessels from infected ports and all infected vessels, and all suspected to be such. Similar provisions are found also in the

older local rules. Something more specific is, however, necessary, and is furnished by the treasury regulations, the later statutes, governors' proclamations, and rules of the more important state and local quarantines. The United States treasury regulations given below may be considered the basis for procedure at most quarantines.[1]

These regulations are a minimum and their enforcement is secured through the assistance of the customs officers. They are very generally followed except perhaps at some of the smaller ports where there are only a few entries during the course of the year.

These are the rules followed throughout New England and on the Pacific coast, except that at Boston all vessels from ports south of Virginia are inspected from 1 June to 31 October, and also all vessels which within six months have been in an infected port. In Provincetown, vessels from the British Provinces are inspected from 1 May to 1 November, and in New Haven all the year round, and in the latter port southern vessels are inspected. Passing from New England towards the south, more attention is paid to the danger of yellow fever infection. In New York, New Jersey, Baltimore, and Virginia vessels from southern points are inspected during the summer. In New York and New Jersey this applies to vessels from below Cape Henlopen, in Baltimore, Cape Henry, and at Newport News and Norfolk, Cape Lookout, but in the latter ports any vessels which at any time within thirty days have been south of the limit are inspected. These inspections are made only between 1 May and 1 November, though in Baltimore the time limits are somewhat elastic according to the season. In the southern states where the greatest dread of yellow fever is felt and where this is the chief disease to be quarantined, the number of vessels subject to

[1] "1. Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

"A. Any vessel with sickness on board.

"B. All vessels from foreign ports.

"C. Vessels from domestic ports where cholera or yellow fever prevails or where smallpox or typhus fever prevails in an epidemic form.

"EXCEPTIONS.—Vessels not carrying passengers on inland waters of the United States. Vessels from the Pacific and Atlantic coast of British America, provided they do not carry persons, or effects of persons, non-resident in America for the sixty days next preceding arrival, and provided always that the port of departure be free from quarantinable disease. Vessels from other foreign ports via the excepted ports shall be inspected.

"D. Vessels from foreign ports carrying passengers having entered a port of the United States without complete discharge of passengers and cargo. Such vessels shall be subject to a second inspection before entering any other port. Vessels from ports suspected of infection with yellow fever, having entered a port north of the southern boundary of Maryland without disinfection, shall be subjected to a second inspection before entering any port south of said latitude during the quarantine season of such port."

the rules is usually larger than at the north, and the rules are more stringent. In South Carolina the statute requires that all vessels from "infected or suspected latitudes or ports" shall be detained five days. In these states suspected ports are those not known to be free from infection in the West Indies, Mexico, Central and South America north of Rio de la Plata, and the west coast of Africa. Unlike many other quarantines, that of Charleston does not inspect vessels from the United States unless such ports are known to be infected, or unless they come via these ports from a foreign country. Such vessels are known as "via vessels." In Savannah "via vessels" and all coastwise vessels which during their last voyage were in a foreign port are inspected. In Florida all foreign and "via vessels" are inspected, and also all domestic vessels between 1 May and 1 November, unless special license is given. Thus at Key West the regular Havana steamers are given certain exemptions, and at Punta Rassa the regular steamer from Myers to Punta Gorda is not inspected. At Pensacola all domestic vessels are inspected during the summer season. Inspection of the sponge fleet is generally required, owing to the frequent off shore communication between the spongers and the Cuban fishermen. At Mobile all vessels are inspected the year around, but a few locally owned coasters and fishermen are exempted by special permit. All vessels arriving at the Louisiana and Texas quarantine stations are inspected.

It is of course the duty of masters to make themselves acquainted with quarantine as with all other laws, and the greater number of captains sailing to the larger and more frequented ports are doubtless well aware of the regulations. If not previously informed they are instructed by the pilots. Tow boat captains also are instructed as to the rules, and would rarely violate them by bringing a vessel beyond the quarantine grounds. At some ports in addition to this, a signal officer is appointed to hail all vessels and order to the proper anchorage all those requiring inspection. Such a signal officer is employed at Providence. Sometimes the quarantine officer is dependent on outside information, thus at Norfolk he is telephoned by the consignees or the pilots' association. At the more important ports the quarantine station is situated near by and commanding a good view of the entrance, and the quarantine officers are supplied with boats, or steamers are constantly on hand, so that no vessel can enter without being seen.

It is of course the duty of all vessels subject to inspection to anchor at the quarantine grounds. These grounds are frequently marked by yellow buoys or by buoys with yellow flags, or a quarantine flag, usually yellow, is set in a prominent place on the shore nearest the anchorage. When the vessel comes to anchor the quarantine signal is to

be set. The old laws of Rhode Island and South Carolina required the colors to be set in the shrouds, but this signal is now used for another purpose, though the Rhode Island law remains unaltered. A red flag is the quarantine signal in Maine, New Hampshire, Oregon and Washington. In Connecticut the statute prescribes white, but yellow is the color used. At Mobile Bay the ensign is to be set at half mast on the fore; but most quarantine statutes and the federal laws prescribe yellow. The quarantine signal for steamers in Louisiana is four long and one short blast of the whistle. At some of the smaller ports vessels are allowed to come to the wharf for inspection. This is the custom in the District of Columbia and Punta Rassa, Fla., and is occasionally permitted in Providence, New Haven, Norfolk, and San Francisco.

Inspections. It is assumed that a medical man will make inspections of vessels, and this is usually done, but it is not always, except in cases of sickness, in Gloucester, Cedar Keys, Perth Amboy, the Atchafalaya station of the Louisiana state board of health and at some of the Florida stations. The laws generally require that inspections shall be made by daylight, but sometimes at New York and in Louisiana they are made at night. At New York this is done by means of an electric light; those undergoing the ordeal are required to pass directly toward a powerful electric light which shines upon their faces and brings the entire person under the eye of the inspector whose back is towards the light. Only "liners" are thus inspected, and in case of suspicion they are detained until morning.

Means must be provided for taking the inspector to the vessel, and at the great ports steam vessels are used for this. The Boston, New York, Pennsylvania, Baltimore, Savannah, Louisiana, and Galveston quarantines have towboats for this purpose. Some of these are large and powerful vessels which run up alongside steamers, which slow down for the purpose, and set the inspector on board. The towboat then cuts loose and the two vessels steam alongside at a good rate of speed so that commerce is interfered with as little as possible and the incoming vessel frequently is not obliged to anchor at all. At some of the smaller cities, as New Haven, Newport News, and sometimes at Providence, the quarantine officer makes use of the regular towboats of the port. Launches are used at Charleston, Pensacola and some of the larger ports. At the smaller ports rowboats or occasionally sailboats are maintained at quarantine, but at some ports, as Providence, New Haven and the other New England ports, no boat of any kind is owned by the quarantine department, and the inspector has to hire a boat for the occasion or trust to a chance ride on a towboat.

When the inspector has boarded the vessel he immediately makes his inspection. The treasury rule requires that

"the bill of health and clinical record of all cases treated during the voyage, crew and passengers' lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests, and any discrepancies investigated."

This is the usual procedure, and in southern ports when the previous voyage is to be considered, the log is generally examined. Besides these details the master is usually required to sign a statement as to the condition of the vessel and the health of the company, and at some ports this must be a sworn statement.

The interrogatory used in Florida is shown below.[1]

[1] *Inspection of vessels arriving at the* ——— ———, *18—*.

"1. Name and class of vessel? ———.

"2. Name of captain or master? ———.

"3. Tonnage of vessel? ———.

"4. From what port is the vessel you command? ———.

"5. How many days have you been on the passage? ———.

"6. Where bound to? ———.

"7. At what port or ports have you touched within the last ninety days? ——.

"8. Were any contagious or infectious diseases prevailing at those ports? If so, name the ports and diseases. ———.

"9. Was any freight, passengers, or ballast received at the ports at which your vessel touched? ———.

"10. Had you any communication with another vessel on your passage? ——.

"11. Have you received any passengers, freight, or ballast from any other vessel? ———.

"12. If so, give particulars. ———.

"13. Have you a bill of health? ———.

"14. During the course of your cruise or passage, what cases of disease have occurred on board, and at what date? ———.

"15. Have any deaths taken place on board of your vessel since you left the last port? If so, what dates and from what causes? ———.

"16. Are there any sick on your vessel at this time? ———.

"17. Has yellow fever, smallpox, cholera, plague, leprosy, or other contagious or infectious diseases ever existed on this ship? ———.

"18. If so, when? ———.

"19. What is the number of officers and crew? ———.

"20. What is the number of passengers? ———.

"21. What is your cargo, and to whom consigned? ———.

"22. If in ballast, what is the character of the ballast, where was it taken from, and how many tons have you on board? ———.

"23. What is the present sanitary condition of the vessel, cargo, crew, and passengers? ———.

——— ———, *Master.*

STATE OF FLORIDA, *County of* ——— :

Before me, ——— ———, a notary public in and for said county and State, personally came ——— ———, master of the ———, to me well known as the person named, who, after being duly sworn, deposes and says that the statements made by him in answer to the foregoing interrogatories are true.

——— ———.

"Sworn to and subscribed before me this —— day of ———, A. D. 189—.

——— ———.

It is customary for the inspector, especially in the south, to examine all parts of the vessel. In San Francisco a very stringent regulation was adopted, aimed at the Chinese immigants.[1]

Masters of vessels from foreign ports are now obliged to obtain two bills of health, one of which is given to the quarantine officer and the other filed at the custom house.

The treasury regulations and also those of several states and cities require the inspection and vaccination of all steerage passengers, and in case there is smallpox on a vessel, all persons must be vaccinated unless they present evidences of recent vaccination or smallpox, or else they must be detained for fourteen days.

In Texas in addition to the master's affidavit the passengers are obliged individually to make affidavit as follows:

STATE QUARANTINE STATION, ———, 189—.

I, —— ———, do hereby solemnly swear that neither I nor my baggage have been in any place infected with yellow fever, cholera, or smallpox within the last twenty days.

Sworn to before me.

Where from? ———. —— ———.

Where to? ———.

A record should be kept of all inspections, as indeed of all other quarantine work, and this is properly done in all the larger stations, but it is frequently neglected in the smaller ones.

After the inspection has been completed the vessel is either sent to the infected anchorage, which should be out of the line of traffic, or else is given pratique. As no vessel can be entered at the custom house unless it has complied with the United States quarantine regulations, a certificate to that effect is usually appended to the permit given by the quarantine officer. The form used in Florida is shown on the next page.

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[1] San Francisco, Regulations of Board of Health, 26 July, 1884:

"The Quarantine Officer and his assistants shall make an examination of every part of the vessel into which they can enter. Those places which can only be entered through manholes, or very narrow places, shall be fumigated with sulphur or chlorine, so as to make it impossible that any person can remain therein. The fumigation shall be so conducted as not to injure perishable articles of cargo. Two or more inspectors shall, after all the Chinese steerage passengers have been brought on the upper deck, commence at the extreme rear portion of each deck, including the lower floor of the engine room and shaft alley, and proceeding forward examine every compartment, stateroom, storeroom, partly-empty coal bunkers, excepting specie, mail, and wine rooms, driving all Chinese steerage passengers they may find on to the upper deck; and all passengers from the inspected portions of the vessel shall be kept secure until the muster is over. When the inspection of the vessel is completed, the Quarantine Officer shall come on deck, and, with the aid of his assistants, shall count the Chinese passengers, men, women, and children, separately. The white passengers and crew must be mustered and counted first."

PORT OF ———, FLA.,———, 189—.

I certify that ———, of ———, from ———, has in all respects complied with the quarantine regulations prescribed by the Secretary of the Treasury, and that in my opinion she will not convey quarantinable disease. Said vessel is this day granted free pratique.

Health (Quarantine) Officer, Port of ———, *Fla.*

Treatment of Persons on Infected Vessels. Formerly if there was a case of contagious disease on board a vessel arriving at quarantine, the vessel with all on board was kept in quarantine until every one had recovered or died. Now, owing to the erection of hospitals and buildings for suspects at the more important quarantines, such barbarous treatment is rarely necessary. It is only at the most important stations that proper facilities are found for such work, though even at such ports as Portland, Providence, and New Haven, smallpox infected vessels that are likely to arrive could be and have been properly handled. Boston, New York, Baltimore, Mullet Key, Fla., and the Louisiana station and also the Reedy Island, Delaware Breakwater, South Atlantic, Tortugas, Gulf, San Francisco, and Port Townsend stations of the marine hospital service are equipped for the care of the personnel of the vessel on shore. It is required by the treasury rules that if a vessel has on board a case of cholera, yellow fever, typhus or smallpox, all of the passengers and crew shall be removed to the shore, the sick put in the hospital and the well kept under observation. The latter should be segregated into small groups between which there shall be no communication. In smallpox this isolation of the exposed is not necessary, provided they have been recently and successfully vaccinated before exposure, as is usually the case with most of the passengers and crew of the regular liners. The duration of detention in yellow fever is ten days, and cholera five days (though in Boston twenty-one days is required for cholera), typhus fever twenty days, smallpox fourteen days, and plague fifteen days. The larger stations are well supplied with hospital buildings, but the arrangements for detention of suspects are not often sufficient and sometimes it is necessary to keep them aboard the vessel. Special measures are taken in regard to passenger traffic between the yellow fever ports of the West Indies and the southern states. According to the treasury regulations this is permitted under the following rules (Treasury Rules, p. 30):

"(*a*) Vessels to be of iron and clean immediately prior to taking on passengers.

"(*b*) The vessel must lie at moorings in the open harbor and not approach the wharves, nor must the crew be allowed ashore at the port of departure.

"(*c*) All passengers and crew must be immune to yellow fever and so certified by the United States medical officer.*

"(*d*) All baggage which has not been disinfected at the port of departure by

*[The evidence of immunity which may be accepted by the sanitary inspector is:
First. Proof of continued residence in an endemic focus of yellow fever for ten years.
Second. Proof of previous attack of yellow fever.]

the United States medical officer, or which is not in bond for points north of the southern boundary of Maryland, shall be disinfected at the quarantine at the port of arrival; no bedding or household effects to be allowed to enter."

The extensive passenger traffic of the gulf ports is usually carried on in this manner.

Treatment of Goods. Certain goods under certain conditions are not admitted at all into the United States. According to the treasury rules, all rags and old textiles, old gunny bags and jute, etc., collected, packed, or handled in any port where there is cholera or yellow fever or has been within thirty days, or from any ports where smallpox or typhus are epidemic, are not admitted. Similar articles from other places are only admitted after disinfection in accordance with the treasury rules at the port of departure. In addition to this, the rules of the New Jersey board of health and the local health regulations of New York and other large ports require that no rags or hides shall be landed without permit from the local health officer. In New Jersey where considerable trouble has arisen from the careless landing of bedding from the Atlantic liners, this must be disinfected with steam.[1]

If smallpox, cholera, or typhus occurs on a vessel, all the personal baggage or other personal effects are disinfected, and at northern ports such materials are not generally so treated for any other diseases. At the south all the baggage accompanying the passenger traffic is regularly disinfected unless in bond for northern points and all infected baggage is labeled.

Except for certain kinds of goods from cholera and plague districts and in the case of vessels from yellow fever districts, disinfection of the cargo is not usually considered necessary. In southern ports, however, vessels from yellow fever ports are detained for the disinfection of their holds and cargoes. There is one class of goods, however, for which detention and disinfection would prove ruinous, viz., fruits of all kinds. As it is not believed that these are carriers of yellow fever, the fruit trade is generally carried on at southern ports in accordance with the regulations given below which were adopted by the Louisiana board of health in 1896.[2]

[1] New Jersey, Rule 4 of State Board of Health, 27 June, 1897:

"No straw or bedding shall be landed from any vessel from any foreign port or from any infected place until said straw and bedding shall have been disinfected under the supervision of the health officer of the port, if there be such an officer, and if there be no such officer then by the officer designated by the local board of health; said disinfection shall consist in exposure, in a closed chamber, to steam at a temperature not less than 240 degrees Fahrenheit for a period not less than thirty minutes."

[2] Lousinana, Board of Health Rules, adopted 23 April, 1896:

"All vessels engaged in the tropical fruit trade between Central American, South American, and West Indian ports and New Orleans, will be allowed to pass the

It is believed that ballast which consists of rock, sand, earth, and sometimes even garbage, is not rarely the means of the introduction of yellow fever, so that in southern ports the disposition of ballast is a matter of considerable importance. The treasury regulations require that the ballast of an infected yellow fever vessel must be removed, except hard rock which may be disinfected in place. The South Carolina law, as indeed that of most southern ports, requires ballast to be discharged at quarantine if it comes from an infected or suspected port; or at least this is the requirement in the summer time. At some stations, as New York, Mobile and Louisiana, the ballast is used for filling to make new land around the quarantine grounds. At Fernandina all ballast must be discharged under water and the Texas ports require that it shall be discharged outside the bars. If water ballast is used,

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Mississippi River Quarantine Station without detention longer than is necessary for a thorough inspection (either by day or night) by the quarantine officers, so long as a properly accredited medical agent of this board certifies that such ports and places are free from contagious or infectious disease, and provided said vessels shall strictly conform to the following conditions:

"First. They shall not be allowed to bring to this port bedding or household effects of any kind.

"Second. After leaving New Orleans said vessels shall not take on board passengers during any part of their trip, nor shall they bring passengers to this port, except as herein provided. Cabin passengers only will be allowed at the discretion of the medical officers, provided the applicant has been a resident of the place for ten days preceding and is known to the medical officer. This officer must satisfy himself that the applicant has not been in any infected locality in the past thirty days and that none of his effects have been exposed to infection.

"Third. They shall carry an acclimated crew, unless impracticable.

"They shall not touch at any infected or suspected port, and have no communication with any vessel during their voyage, except in case of distress.

"Fifth. They shall only touch at such ports or stations as are mentioned in their schedule, which latter shall be communicated to the board of health.

"Sixth. They shall be required to make a full disclosure when arriving at a quarantine station of all the ports and places they have visited on their voyage.

"Seventh. They may take on board a crew of laborers known to be acclimated and from some healthy point where they permanently reside and remain, the crew being as nearly as possible always composed of the same men. The captain or other officer may go ashore for the purpose of entering or clearing vessels only. Any further communication with shore or natives will be considered a violation of regulations, and vessels in default will be treated accordingly.

"Eighth. These vessels shall be cleansed and, when necessary, disinfected in the city of New Orleans, after discharge of cargo.

"Ninth. Vessels receiving night inspection at quarantine will not be allowed to discharge cargo on arrival at New Orleans until after a daylight inspection by the shipping inspector of this board, and the captains, owners, or agents shall not allow anyone to go ashore or to come on board until after such daylight inspection.

"Should for any reason a fruit port become infected or even suspicious, vessels from that port will be liable to such additional regulations as the board of health may adopt."

it must be discharged at sea or disinfected. Rock ballast is disinfected on board or on shore by immersion in a solution of corrosive sublimate, 1 to 1,000, or by the use of gaseous disinfectants, or by both. The removal of ballast is done by quarantine employees who should be yellow fever immunes. A charge of twenty-five cents per ton is made in Florida ports and in some others, but in Mobile the cost is somewhat less. At Savannah it is twenty cents a ton.

Disinfection. In the north as a rule only infected vessels are disinfected, though if they come from infected ports or ports suspected to be such, they may be disinfected even if no infection is known. Thus at New York vessels from yellow fever infected ports or from ports where smallpox, plague, or cholera are epidemic are disinfected. Sometimes, however, the disinfection is limited to the steerage and forecastle. More rarely is the hold disinfected. At the south it is the routine in summer season to disinfect all vessels arriving from ports below north latitude 25°; but, as has been said, exceptions are made for fruiters and regular liners. For disinfection, steam, sulphur, corrosive sublimate and formaldehyde are all used. The requisites for efficient disinfection are laid down in rules issued by the secretary of the treasury. Of course only the larger ports have arrangements for thoroughly disinfecting a large vessel, though any well equipped municipal health department might disinfect a small vessel as well as it can a house. For sulphur disinfection a sulphur furnace with a fan is used. By this means as much as eighteen per cent. sulphur dioxide may be forced into the hold. Such furnaces are found at Portland, New York, Charleston, Fernandina, Mobile, Mullet Key, Louisiana, and Sabine Pass, and at most of the federal stations. The health officer at New York, however, prefers ordinary sulphur pots to the furnace. The formaldehyde apparatus is that designed by Kinyoun, and has only recently come into use.

Steam disinfecting chambers are found at most of the federal stations and at Boston, Portland, New York, Baltimore, Charleston, Fernandina, Mullet Key, Pensacola, Mobile, Louisiana, Sabine Pass, and Galveston. Some of the chambers are very large, that at Louisiana being 50 by 8 feet and that at Galveston 60 by 8. Corrosive sublimate solution discharged from a tank through a hose is used for flushing the interior of vessels at all the more important stations. At the state quarantine stations of New York and Louisiana a steamer is fitted up with a disinfecting plant and several of the federal stations, as Cape Charles, Ship Island, San Francisco and Tortugas, have such vessels.

Fees. The fees collected from vessels inspected and undergoing quarantine have been a source of much trouble. At some ports the amount is very great, and if the fees belong to the officers in charge the

latter are unlikely to permit any change which would lessen their income. In other cases, the fees may go to the city with the same results. The fee system is bad and has done much to prevent improvement in quarantine administration. Federal quarantine is free as is that of the state of Texas, and the Tacoma and Charleston quarantines have recently been made free; but at most ports fees are still collected. The following are some examples of these fees:

In Gloucester, Mass., $2 for inspection and $3 if a physician makes it. In Providence and South Carolina it is $3; in New Bedford, New London, New Haven, Port Angeles, $5; Newport News and Norfolk, $5. In many ports the fee is graded according to the size of the vessel. In Boston it is $8 for vessels of over 500 tons and $5 for vessels under that. In New York it is $5 for foreign vessels and $1 to $3 for coasters and $5 extra for night inspections. In Baltimore the fee for inspection is one cent per ton with a minimum of $2. In New Jersey foreign vessels are $5, domestic $3, and domestic sailing vessels $1. The inspection fees in Savannah are $15 for steamers, $10 for ships or barks, $7.50 for brigs or schooners. In Florida steamers are $10, three and four masted vessels $7.50, two masters $5, sloops, $3. In Louisiana ships are $20; barks, $17; brigs, $10; schooners, $7.50. Disinfection fees also vary according to the size of the vessel. In New York they are from $5 to $50; in South Carolina, $10 to $68; in Florida, $20 to $60; in Louisiana, $17.50 to $130. At Key West the fee for disinfecting a trunk is fifty cents, a valise, twenty-five cents. In Boston when passengers are bathed $1 is charged for each bath. Twenty-five cents is charged for vaccinations in Boston, and in Portland, Ore. also, this is the fee.

Inland Quarantine.

The quarantine of one place against another by land as well as by sea was practiced in early colonial times and was authorized by the statutes of Massachusetts and Rhode Island in the first part of the eighteenth century. Shotgun quarantines were not unknown and men with loaded flint-locks were stationed outside of villages to intercept cases of smallpox that might travel that way. Towns might quarantine against towns either in the same or neighboring states, and frontier towns sometimes had special privileges and duties in regard to this. At present many laws seem to recognize a distinction between interstate quarantine and local quarantine between towns within the state.

Interstate Quarantine. In 1797 the act given below was passed in Massachusetts,[1] and, like so many Massachusetts laws, has been copied

[1] Massachusetts, Pubic Statutes (1882), Chapter 80, Sec. 42:

"The board of health of a town near to or bordering upon either of the neighboring states may appoint, by writing, suitable persons to attend at places by which

by other states, as Colorado, Maine, Michigan and North Carolina, and a somewhat similar law is found in Kentucky. In this act the burden of interstate quarantine is thrown upon the frontier towns of the state. In Washington also the towns alone are charged with the duties of interstate quarantine; but in all the states mentioned, except Massachusetts and Washington, the state board of health also has authority to establish quarantine against the introduction of communicable disease. Of course before the organization of state boards of health it was natural that whatever interstate quarantine there was should be administered by local boards of health on the frontier, just as maritime quarantine was, and is in many cases now, administered by the seaport towns; but with the organization of state boards of health it was seen that much more uniform and efficient action might be secured by this central authority.[1]

Very many of the states named below allow the local governments within their borders to establish local quarantine, and it can be readily seen that such may conflict with the state operations, hence most of the laws provide that the state authority shall be supreme. The best of these interstate quarantine laws provide that the state board of health shall establish quarantine, may make rules and regulations, establish stations, appoint inspectors, provide for the sick, and disinfect, and also provide that all common carriers shall obey the rules so made. A good example of these laws is that of New Hampshire given below.[2]

Some of the state laws also deal directly with the details of inland quarantine, and as maritime laws require masters of vessels to report

travellers may pass from infected places in other states; who may examine such travellers as to suspects of bringing any infection dangerous to the public health, and if need be may restrain them from travelling until licensed thereto by the board of health of the town to which they may come. A traveller coming from such infected place, who without such license travels within this state except to return by the most direct way to the state whence he came, after he has been cautioned to depart by the persons so appointed, shall forfeit a sum not exceeding one hundred dollars."

[1] At the present time the state sanitary authority is authorized to enforce quarantine measures against the introduction of communicable disease into the state in Alabama, Colorado, California, Iowa, Illinois, Indiana, Florida, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Missouri, Mississippi, New Hampshire, New Jersey, North Dakota, Ohio, Rhode Island, South Dakota, Tennessee, Texas, Virginia, Vermont and West Virginia.

[2] New Hampshire, Act of 5th March, 1895.

"Section 1. The power to establish quarantine within this state shall be vested in the state board of health, and said board, whenever it is required necessary to prevent the introduction of the cholera, small-pox, or other epidemic diseases from another state, or from any other country, and to restrict said diseases if introduced, shall have the power to establish quarantine stations at such places as may be deemed necessary, and the said board shall make and enforce such quarantine rules and

cases of communicable disease, so the Colorado statute requires train conductors to do the same, and to hold their trains subject to the state board of health. A similar law in regard to holding trains is found in Maine. In Alabama and some other states it is forbidden to bring in communicable disease, and in North Carolina common carriers which bring in such cases must take them out. Under these laws many state authorities have made sets of rules. Among such, New Hampshire, Michigan, Florida and Mississippi furnish good examples. Florida and Mississippi have a very elaborate set of rules including those approved by a conference of health authorities held in Atlanta, 12 April, 1898.

Many states have still further provided against the introduction of communicable disease by maintaining an emergency fund which in the case of threatened invasion of epidemic diseases may be drawn upon by the state board of health with the approval of the governor. This fund ranges from $3,000 in Tennessee to $50,000 in Pennsylvania, though in the latter state the board of health does not appear to have been given such explicit powers in regard to quarantine as in some other states. In Michigan no limit appears to be set upon the amount to be spent.

The towns were the first administrators of interstate quarantine, and then with the organization of the state boards of health the latter took on these powers; but with the development of the idea of federal control of interstate commerce, and the conferring of quarantine powers upon the marine hospital service, a new factor appeared. By the act

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regulations as it may deem best for the public good, said rules and regulations to be in force when approved by the governor of the state.

"SEC. 2. It shall be the duty of local health officers, in their respective towns, to enforce all rules and regulations issued by the state board of health; but should it become necessary to establish quarantine stations, for the purpose of detention, isolation, disinfection, etc., the expense of the same, and its maintenance, shall be paid from the epidemic fund of the state. Local boards of health may establish quarantine in their respective towns, but shall report immediately such action to the state board of health; and it shall be the duty of said board, as early as practicable, to ascertain the necessity of such quarantine, and shall either approve and enforce the said quarantine, or declare it raised.

"SEC. 3. Whenever quarantine is declared, all railroad and steamboat corporations, and the owners, consignees, or assignees of any railroad, steamboat, stage or other vehicle used for the transportation of passengers, baggage, or freight, shall submit to the quarantine rules and regulations established by the state board of health; they shall submit to any examination required by the health authorities, respecting any circumstances or event touching the health of the crew or passengers, and the sanitary condition of vehicles, baggage, or freight; and any person who makes a false declaration respecting the points under examination, or who violates the quarantine rules and regulations, shall, upon conviction thereof, be fined not more than two hundred dollars, or be imprisoned not more than six months, or both."

of Congress of 15 February, 1893, the secretary of the treasury was authorized to make rules for preventing the spread of communicable disease from state to state, and on 27 September, 1894, such rules were promulgated, and are to be enforced by the marine hospital service. These rules relate to cholera, yellow fever, typhus fever, leprosy, and plague. All outbreaks of these diseases are to be reported to supervising surgeon-general, marine hospital service. The rules are mostly ordinary rules in regard to isolation and disinfection; but a few have to do more directly with commerce:

"No common carrier shall accept for transportation any person suffering with a quarantinable disease, nor any infected article of clothing, bedding or personal property.

"The body of a person who has died of a quarantinable disease shall not be transported save in hermetically sealed coffins, and by the order of the state or local health officer. . . .

"Localities infected with yellow fever, and localities contiguous thereto, should be depopulated as rapidly and as completely as possible, so far as the same can be safely done; persons from non-infected localities and who have not been exposed to infection being allowed to leave without detention. Those who have been exposed, or who come from infected localities, shall be required to undergo a period of detention and observation of ten days from the date of last exposure in a camp of probation or other designated place.

"Clothing and other articles capable of conveying infection shall not be transported to non-infected localities without disinfection.

"Persons who have been exposed may be permitted to proceed without detention to localities incapable of becoming infected and whose authorities are willing to receive them, and after arrangements have been perfected to the satisfaction of the proper health officer, for their detention in said localities for a period of ten days.

"As soon as the disease becomes epidemic the railroad trains carrying persons allowed to depart from a city or place infected with yellow fever shall be under medical supervision.

"Common carriers from an infected district, or believed to be carrying persons and effects capable of conveying infection, shall be subject to a sanitary inspection, and such persons and effects shall not be allowed to proceed, except as provided for by paragraph 2."

Local Quarantine. In a large number of states[1] the local board of health of the town or county is authorized to establish quarantine and often to make rules and regulations regarding it. Similar provisions are found in numerous charters, as those of Kansas, Nebraska cities, and Pennsylvania, and in Baltimore, Chicago, and St. Louis. Outside of these states probably most towns and cities would be authorized under their general grant of sanitary powers to maintain quarantine, so that

[1] Maine, New Hampshire, Vermont, Rhode Island, Connecticut, Colorado, New Jersey, Delaware, Georgia, Idaho, Louisiana, Michigan, New York, South Carolina, Texas, Utah, Washington, Alabama, North Dakota, South Dakota, Ohio, and West Virginia.

probably every city is able to do this, unless there is some adverse provision in the statutes. In Florida and Mississippi the state board of health only may establish quarantine, and in a considerable number of other states local quarantine can only be maintained with the approval of the state board, as in Alabama, Kentucky, Louisiana, Maine, New Hampshire, South Carolina, and Texas.

Very many cities, both within and without the states above mentioned, have forbidden by their rules the introduction of communicable disease. Most of these rules are very general, and simply require that no infected person or thing shall come or be brought into the city. The ordinances of Denver and Omaha require that conductors shall report cases of communicable disease, and in Denver they must hold the train five miles from the city and telegraph. In Atlanta and Macon, Ga., and Spokane, conductors must not bring in trains when ordered not to or when they are infected. The ordinances of Chicago and St. Louis confer quarantine powers upon the health commissioner and authorize him to establish inspection after giving notice, and to stop trains and boats and detain persons. A number of southern cities have adopted the regulations of the Atlanta conference referred to on page 651.

In the northern states there is rarely felt to be any need of inland quarantine, but occasionally such quarantines are maintained. Thus in 1885, during the smallpox outbreak in Montreal, several states, including Michigan and New Hampshire, and a number of cities, quarantined passenger traffic from Canada. The United States marine hospital service also coöperated. The nearest and closest connection between Montreal and the United States is with New England. As soon as the states became alarmed at the amount of smallpox in Montreal a conference was held with the Canadian authorities and with the railroads, and it was decided that all trains to the States should be stopped at the border and passengers and baggage transferred. The marine hospital service established an inspection at this point and also a disinfecting plant. The state board of health of New Hampshire, not being satisfied with the federal service, put on inspectors of its own, who boarded every train entering the state from Canada. The rules given below were for the government of these inspectors.[1]

[1] "1. All persons coming from Canada and destined to any point in New Hampshire, must be examined with reference to vaccination, and all such found unprotected, if from a locality infected with smallpox, must be vaccinated by the inspector or detained for quarantine at such place as the inspector may designate.

"2. The inspector must issue to all persons coming from Canada, whether destined to points in New Hampshire or elsewhere, the railway inspection ticket, issued by this board, so punched as to indicate to the health officer at destination of trip, as per arranged understanding of punch marks, all the knowledge obtained of said

"The inspector, in making his regular train inspection, ascertained from what place the passenger came, and if from Montreal, as will be seen by the key, the letter A was punched out of the ticket; if he had checked baggage, the letter F was also punched; if recently vaccinated, the letter D was punched out. The ticket was then signed by the inspector and given to the person inspected, who, not knowing the significance of the punched letters, regarded the same as a clean bill of

person as to whether said person came from an infected locality or not, when vaccinated, whether with checked baggage, etc.

"3. For the information of local health authorities, the inspection ticket may be issued to persons coming from localities in the state, when, in the judgment of the inspector, such persons would be liable to suspicion by the local health authorities at the point of destination.

"4. The inspector will notify by telegram all towns and cities requesting it, when any suspicious persons are found destined for such towns and cities.

"5. The inspector will keep a record of all persons coming from Canada and destined to points in New Hampshire, with the place of destination, date, and other facts required by the inspector's record check, and of the number of inspection tickets daily issued to such persons going to other states, with the name of the state.

"6. Inspectors will render a weekly report to this board of the number of trains inspected, and return with such report the inspector's record checks for the same week."

Month.	RAILWAY INSPECTION SERVICE, STATE BOARD OF HEALTH, NEW HAMPSHIRE.	
OCT. NOV. DEC. JAN. FEB. MAR.	To be retained by the person to whom given, unless taken up by a health officer at destination of trip. This ticket will save the bearer the trouble of unnecessary inspections. Ce billet doit être retenu par la personne qu'il est donné, à moins qu'un officier de santé vous le prenne à destination du voyage. Ce billet exemptera au porteur déplaisir d'une inspection non nécessaire. .....*Inspector.* IRVING A. WATSON, *Secretary.*	A B C D E F
Day.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	

KEY TO LETTERS ON INSPECTION TICKET.

A. From Montreal or other infected locality.
B. Cannot learn from what locality the person came.
C. Came from an uninfected locality.
D. Recently vaccinated.
E. Has vaccination scar on arm.
F. Has checked baggage.

Read only the letters that have been punched.

IRVING A. WATSON,
Secretary.

health. The health officers on the lookout for such persons demanded the inspection ticket at their point of destination, and one punched as indicated above would inform the health officer that the person holding the same had come from Montreal with checked baggage, and had recently been vaccinated."

The work of the state board was supplemented by that of the local boards especially in disinfection. The following is an account of what was done in Manchester:[1]

"The Manchester Board of Health established fumigating rooms in the railroad station at that place, and maintained a very thorough system of fumigation of persons and baggage from October 3 to December 25. The board was no respecter of persons or conditions, inasmuch as all persons who had come from the province of Quebec were regarded as suspicious, and were required to register and be inspected at this station. During the period named the board fumigated one thousand, two hundred and sixty persons; of this number four hundred and twenty-one were known to have come from infected districts, and it was conclusively proven that some of them had come from houses where the disease existed, and had served as nurses for those ill with it. The number of trunks fumigated was four hundred and thirty-one; handbags, valises, etc., two hundred and sixty-five; boxes containing household goods, provisions, etc., two hundred and two, many of them weighing from six hundred to eight hundred pounds each, constituting, in all, many tons of this class of goods."[1]

During the presence of cholera in Europe in 1892–3 great alarm was felt in this country, and maritime quarantine was made more stringent in nearly all ports, and most cities passed through a general cleansing. Some of the states, especially the central states, placed little confidence in maritime quarantine, as then administered, particularly in that of Canada. In September, 1892, a conference of the state boards of health of the central states and many railroad officials was held in Chicago, and regulations were adopted in regard to immigrants which were subsequently adopted officially by the various boards attending the conference.[2] These rules required that all immigrants should obtain from the quarantine officers at their port of debarkation a certificate, stating their history in relation to cholera and that they were not infected, and that their baggage had been disinfected. All other immigrants should be held at state boundaries for inspection and disinfection. Transportation companies should notify inspectors in advance of the arrival of immigrants. The state board of health of Michigan[3] also adopted other rules requiring that no carrier should bring into the state any immigrant or baggage until inspected by an inspector appointed or accredited by the state board. No baggage was to be admitted unless

[1] New Hampshire, State Board of Health Report (1886), p. 136.

[2] Michigan, State Board of Health Report (1893), p. XXVIII.

[3] Michigan, State Board of Health Report (1893), p. LXXXIII.

disinfected by a Michigan inspector; but baggage was excepted which bore a certificate of disinfection from an accredited inspector, or from a Canadian official, or which was known to have come from a non-infected ship, or which was in a sealed car for transport through the state. The state board of health appointed inspectors to carry out these regulations at all ports of entry. The following is a description of their work by the inspector at Port Huron :[1]

"Steerage passengers destined to stop in Michigan, are all detained, and their baggage is disinfected by us. There are two kinds of steerage passengers, those who come by way of American ports, and those by way of Canadian ports. Those who come by way of Suspension Bridge having entered the United States at either New York or Boston, and are destined not to stop in Michigan, their baggage is sealed in a car, and passes right through the State; if destined to stop in Michigan, the baggage is all disinfected on the American side at Port Huron. The baggage of immigrants by way of ports, other than American ports, is all disinfected by us at Sarnia, in Canada. On both sides of the line our steam disinfection is done in a box car which has been especially fitted for our use. It is made of matched lumber and then lined thoroughly inside, so that when closed it is practically air-tight. An engine is run up by the side of the car, and the steam is first run into the iron coils around the car, which raises the temperature to about 120° F., and it is held there for about twenty minutes; then live steam is turned into the car, and the temperature is run up to about 220° F., and held there for an hour. At the expiration of this time the ventilator at the top of the car is opened to let the live steam out of the car gradually, at the same time the steam in the coils is kept up, and by the time the things are ready to come out of the car they are all dried by the heat from the coils. All the baggage except the leather and furs is disinfected in this way; the rest is disinfected by the fumes of burning sulphur, for which purpose a regular box car is used; it is not lined, but it is a comparatively tight car. Things to be disinfected are all spread out in the car, and then sulphur is burned for about three hours, at the rate of three pounds per one thousand cubic feet of space, which is the amount recommended by your board. It is almost impossible to go into the car for a half hour after the car has been opened. The immigrants assist the inspectors in this disinfection, by opening up their trunks and other containers, and placing the articles of clothing, etc., on wires strung in the car, or laying them out on the shelves. The containers are all disinfected by sulphur fumes. I generally find that the immigrants by way of Boston are without certificates. We have issued a small card signed by the inspector, which states that the immigrant has passed the inspection at Port Huron. The baggage has attached to it a "sticker" which states that it has been through our disinfection. The train books which I have made have been of material aid to our inspectors, and are constantly used. All the facts relative to the immigrant, which we can obtain, are noted in the train book, copied into a book and reparted to the State Board of Health. Immigrants are released to pass on after receipt of telegram to that effect from the office of the State Board."

Some of the railroads, as the Grand Trunk, co-operated with the state board and arranged for disinfection as above, but the "Soo" road brought suit for interference with its business at Sault Ste. Marie and lost its cause in the United States Circuit Court.[2]

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[1] Michigan, State Board of Health Report (1893), p. XLIII.

[2] Minneapolis, St. Paul and Sault Ste. Marie R. R. *vs.* Board of Health of Michigan, U. S. Circuit Court; Western District of Michigan, Northern Division, 29 July, 1893.

A number of cities, among which were Chicago, Milwaukee, and Minneapolis, established additional inspections of their own. In Chicago,[1] "the railroads entering the city placed at the disposal of the health department their resources — the department was notified of the approach of trains conveying immigrants by telegraph, and in time that the medical and sanitary inspectors could board trains from fifty to one hundred miles outside the city, and thoroughly perform their inspection of immigrants and their baggage before the city was reached.

"From September 8, 1892, when this quarantine inspection went into effect, until December 31, 1892, over 20,000 immigrants and their personal belongings passed through the hands of the department of health; of this number 2,916 remained in Chicago. The department has a complete record of the name, nationality, port of embarking and date, name of steamer, port of entry and date of arrival, number of days detained in quarantine, railroads traveled on from seaport to Chicago, date of arrival in Chicago, name of inspector who examined, address, street and number destined to in Chicago; all this information has been compiled for future reference. Immigrants were allowed to proceed to points beyond Chicago who held a quarantine certificate for person and baggage signed by a surgeon of the U. S. Marine Hospital service or the health officer of the port of entry. The baggage of immigrants destined to Chicago was most thoroughly examined, and often fumigated even if it had been at the port of entry; the officers of this department were determined to take no chances."

During the outbreak of smallpox in Muncie, Ind., in 1893, the state board of health felt it necessary to quarantine against that city, as shown in the following order:[2]

"'The Indiana State Board of Health hereby orders that no passengers, or their baggage, be received on railroad trains passing through Muncie, this State, unless they have a certificate from the local health authorities that their baggage has been properly disinfected, and that they have been successfully vaccinated.'

"Near the Big Four depot a box car was provided as a fumigating station, and here the contents of trunks, valises and bundles passed through a process of fumigation or disinfection before leaving the city.

"At the city postoffice a large sheet-iron box four feet square and six feet high was used to fumigate all mail leaving the city. The process of fumigation lasted about one hour."

The railroads required a certificate that the holder had been vaccinated, and was free from infection. It was said that many were fraudulently obtained and fraudulently used. While railroad passenger traffic was almost entirely stopped, it was possible to leave the city in

[1] Chicago, Report of Department of Health (1893), p. 36.

[2] Indiana, Report of State Board of Health (1893), p. 114.

other ways, and it was estimated by the health officer of Muncie that probably 1,500 persons left the city in one way or another.

Even at the present writing absolute quarantine is declared at several places in West Virginia on account of the presence of smallpox in adjoining regions. The proclamation of the board of health of Elkins, West Virginia,[1] is shown below.

At the south, where the danger of yellow fever is a real one, the necessity for inland as well as for maritime quarantine is felt to be a necessity. Whenever an outbreak of yellow fever occurs at any point in the southern states many localities are certain to quarantine every line of approach against the infection. Non-infected cities and counties consider it their first duty to keep out the disease and are the authors of shotgun quarantine. It is not for them to consider the welfare of people in the infected districts. It is the common practice for such communities to forbid all communication with the infected locality. No persons or goods can come in without the permission of the health officer. But something must be done besides proclaim quarantine. Often notice is sent to the infected community warning travellers. The transportation companies are notified and placards posted. The quarantine is advertised in every way. To enforce the quarantine inspectors are appointed who travel on all trains approaching the city, or meet boats at the wharf, or are stationed at other approaches. In Augusta, Ga., in 1897, persons from infected places were forbidden to come

[1] Public Health Reports (1900), p. 516:

"FEBRUARY 9, 1900.

"Whereas, the board of health of the city of Elkins is advised that smallpox prevails in many communities in dangerous proximity to this city, and deems it highly important that the disease be prevented from reaching this city.

"Therefore it is ordered by said board of health that from and after this date until the further order of this board, no person from the counties of Gilmer, Lewis, Harrison, Calhoun, or Fayette, in this State, or from the town of Buckhannon, in the county of Upshur, or the town of Camden-on-the-Gauley, in Webster County, in this State, shall come into or pass through the city of Elkins:

"That no goods or merchandise, by any conveyance whatever, shall be brought into or taken through said city of Elkins from any place or territory above mentioned:

"That no person now within the corporate limits of said city of Elkins shall visit any of the places or counties above mentioned and thereafter return to said city of Elkins:

"That all communication, except by telephone or telegraph, is prohibited by persons now in the city of Elkins with persons in the counties or places aforesaid, or any other place known to be infected with smallpox.

"That all railroads or other common carriers are forbidden to convey passengers, letters, or packages from any of the counties or places herein mentioned, into or through said city of Elkins.

A. S. BOSWORTH, M. D.,

President Board of Health for city of Elkins."

within forty miles of the city, and if found on the train they and their baggage were put off at the nearest station. One lot of freight that had been smuggled in was burned in the freight yard. Another lot which had been sent from New Orleans by way of New York to avoid suspicion, and was discovered before it was unpacked, was promptly shipped back again.[1] In Charleston in 1888 several persons from Florida who were caught trying to enter the city were sent to the lazzaretto and detained there ten days.[2] In Atlanta in 1897 and 1898 the quarantine was less strict. Train inspection was maintained as in other cities, but only persons who were suspiciously sick were detained, and others, after giving their city addresses, were allowed to enter the city. If the incomers can show certificates that they are from an uninfected locality they are usually freely admitted. The form of certificate given in Atlanta is shown in Appendix 113.

The state authorities and the federal officers have, during these yellow fever outbreaks, a greater responsibility and a more difficult problem than do the local officers of either infected or uninfected cities. Local health officers are interested chiefly in their own communities and it matters little to them what becomes of infected refugees. It is only state and federal officers that can be expected to look after the interests of the infected and uninfected alike and to see that traffic is as little interfered with as possible. Many local quarantines of varying strictness, some weak and poorly managed, and others of the harshest non-intercourse variety, present a condition that is almost unendurable, and also one that is far from accomplishing the end sought for. Attempts have been made to secure greater uniformity in inland quarantine regulations, and conventions were held in Atlanta in 1898 and in New Orleans in 1899 which were attended by local, state, and federal health officers and representatives of the railroads, and regulations were formulated which were very generally adopted by state and local officials, and are in the main like those enforced by the marine hospital service. Of course, many of the state and local boards have additional rules. Thus the Mississippi state board of health after adopting the rules of the Atlanta convention added others specifying more fully the conditions for railroad traffic.

It is undoubtedly safer and more economical to control the spread of communicable disease at a single point of origin, than it is to guard against its introduction into a thousand uninfected localities. This control of the outgo can, however, only be accomplished through the

[1] Augusta, Report of Board of Health (1897), p. 21 *et seq.*

[2] Charleston, Report of Department of Health (1888), p. 4.

agency of the state or federal authorities. One way to secure unification throughout the state is for the state to assume entire control as in Florida and Mississippi: another is to strictly co-ordinate the state and local guards as was done in Alabama by the act of 25 February, 1898. Undoubtedly the best results can be obtained only when all three sets of officials act together. In preventing the outward movement of infection both persons and goods must be considered.

It is in general the policy of the marine hospital service when placed in charge to immediately quarantine a town in which yellow fever is reported. This is at first temporary pending an investigation as to the fact of the presence of the disease and its prevalence. This temporary quarantine is not to be established: first, if the case is an imported one: second, when the town is a large one. This apparently illogical exception of large towns is made because (a) there is less chance here of general infection, (b) there is less chance of a general exodus, and (c) the loss to the large city is so great as to render it impracticable. The next step is a thorough investigation of the case or cases, and of all who have been exposed. The mortuary records are studied and cases investigated which are likely to have been yellow fever reported under another name. If the infection is slight and the foci of the disease well under control the general quarantine may be raised. Or if the disease is confined to a particular section of the city that section alone may be quarantined as in Biloxi in 1897. This is ordinarily done in the larger cities, as in New Orleans, Mobile, and Memphis, in 1897. If, however, infection is general, absolute quarantine of the infected town is established, as in Brunswick, Ga., in 1893, and it was done in quite a number of smaller places. In Brunswick twenty-eight land guards were employed and thirty-four water guards:[1]

"The land-guard posts consisted of three men each, all of whom were required to be on duty at night. One was permitted to be absent during a part of the day. They were paid $2 per day, subsisting themselves.

"The posts were four miles or more from Brunswick, including a sufficient area to keep me from the charge of cooping up people. The posts were supplied with tents by me. The water-guard stations, except No. 9 at Jekyl Pass, which had seven men, consisted of three men each, who furnished their own boats, arms, and provisions, and received $2.50 per day. The water duty was vexing, difficult, and at times dangerous; but the duties were always done on honor in spite of weather."

It is considered better to take guards from the region to be protected rather than from the infected region. Absolute quarantine did not, however, mean that no persons should go in or out: but only that they

[1] These quotations are from the Report of Supervising Surgeon-General of the Marine Hospital Service (1893), p. 26.

should not do so except with the consent of the surgeon in charge. Surgeon Murray thus describes the issuing of passes in Brunswick:[1]

"Gentlemanly, orderly, and business communication was freely permitted. Persons were allowed to come into Brunswick after 9 A. M., and required to leave before 3 P. M., for transaction of actual and necessary business. No person dare say the principles of visitation were not well known to him. In no instance did disaster follow the simple adherence to my wishes, and were I to conduct a cordon every year I would ever permit just what I did permit this season. The land and water guards kept records of all persons passing in and refused to permit them to return any day after without a pass from me. All guards permitted people to pass out on business errands who held passes written by me. Every pass was taken up on first presentation and subsequently returned to my office. Thus country produce could come, fish, beef, horses, milk, hay, and feed could be procured, and articles absolutely needed on islands and in the country were obtained with scarcely an idea in the minds of the people that all were under surveillance. No favors were shown to anyone. No passes were given for fun or comfort. Business or distress were the the only pleas that obtained the coveted slips."

No harm was reported as resulting from these passes and the surgeons of the marine hospital service feel that such communication open and above board, though perhaps somewhat dangerous, is far less dangerous than the illicit communication which would otherwise be sure to occur.

It is desirable if possible to permit the removal of all well persons from the infected town. This is partly for their own safety and partly for the community which they leave. The fewer people in the infected town if it is quarantined, the easier it is to care for them. Then too it greatly hinders the service to have constantly to deal with persons chafing under restraint. Such well persons are allowed freely to depart if they are to go to regions where yellow fever can not prevail, but if for yellow fever regions they must pass through a detention camp.

Detention camps are located as near to the infected district as a healthful location can be obtained. The location should be dry and there should be a good supply of water. Tents are very generally used for yellow fever camps and they have board floors raised from the ground. The following advice is from the Marine Hospital Report for 1898:

"The camp consists of a hollow square, of which the buildings form one side and tents three. A double camp, its two parts independent, except for a common executive office and kitchen (although not always feasible), presents the advantage that seldom or never will there be any suspicion attached to Camp No. 2, because, as a rule, nearly all sickness has, in our experience, developed within the first four days, and hence would be developed in Camp No. 1. This plan of a double camp would naturally inspire in the people outside more confidence in the safety of camps, and, although not at all a sanitary necessity, may be expedient, for its moral effect alone. Such double camps should be divided, not only by guards, but by a double

[1] These quotations are from the Report of the Supervising Surgeon-General of the Marine Hospital Service (1893), p. 26.

fence of barbed wire as well. The whole of both camps should be surrounded by a double barbed-wire fence, at least six feet in height, each fence to have wires six inches apart, from top to bottom, and the two fences set eighteen inches apart, so as to render egress in haste a matter of physical impossibility. All refugees in the main camp should be housed in tents, in order that disinfection may be easy after any suspicious case has occurred. Kitchen and dining rooms should be arranged so as to involve a minimum of time and labor in serving meals, and with capacity in the latter for seating the whole number of refugees at one time. For purposes of good discipline, there should be provided separate tables for subaltern officers, such as commissary, quartermaster, clerks, et al., in order that they may the better preserve their proper authority over attendants; officers of the guard may be included in the list of such officers, or the whole guard messed together, according to circumstances. It is not at all advisable that the guard, however, should mess with the lower grade of attendants, as the responsible nature of guard duty is prima facie evidence of the necessity for a better class of men for these important posts, and they should therefore be separated when possible.

"In addition to the privies located on the plans there may be necessity for providing a few, more convenient of access, for delicate women, and these should by all means be dry earth closets located in a tent, and daily emptied. The locations indicated in the plan should not be considered as essential, but should be varied to avoid contamination of the water supply or for other sanitary reasons.

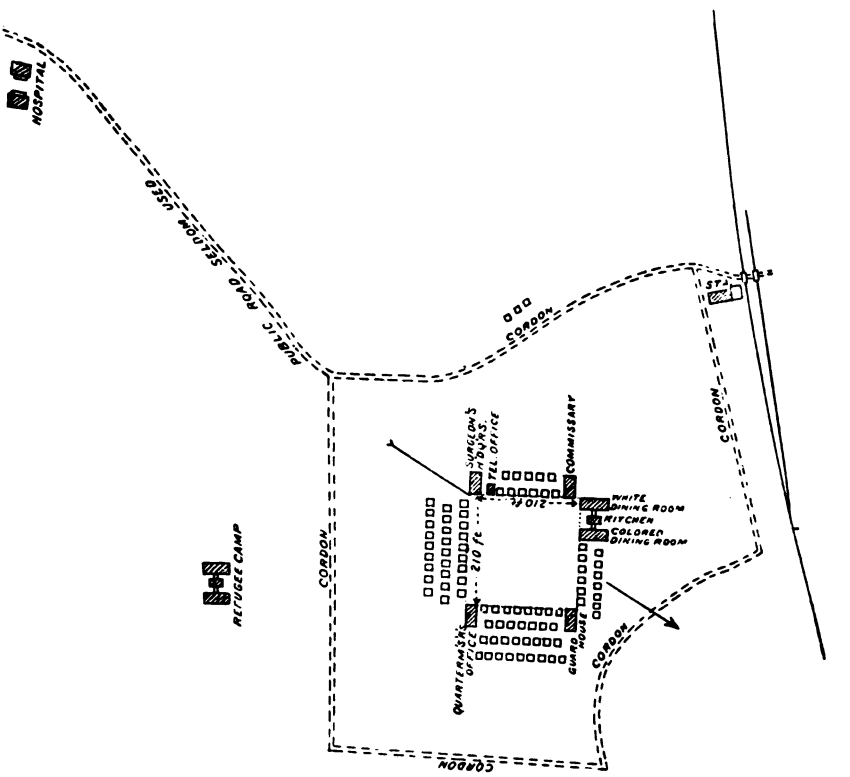

FIG. 70.

Plan of Detention Camp established by the Marine Hospital Service at Brunswick, Ga. From Report of Supervising Surgeon-General, 1893.

"If not already existent, a sufficient amount of railroad siding should be provided to hold the necessary cars for disinfection and commissary purposes. At a point most convenient for this purpose on this siding there should be built a waiting and dressing pavilion containing from four to six rooms, to be used for the purpose hereinbefore mentioned, and from four to six tents, end to end, for examination, reception, and registration of applicants for admission.

"In addition to the commanding officer, the medical staff, and the hospital steward, the necessary personnel of a detention camp should be:

"(A) Guards, who should be placed at intervals, long or short, according to the topography of the site, and be under officers to be named hereafter.

"(B) Disinfecting force.

"(C) Quartermaster, commissary, clerks, bugler, telegraph operator.

"(D) Cooks, waiters, laundresses, scavengers, teamsters.

"All persons seeking admission to a camp should be given a permit by some responsible agent in the infected centre, and such permits in any one day should in no case equal more than one-eighth of the total capacity of the camp. Upon the arrival of a refugee at camp he should be at once examined as to his health by one of the inspecting officers detailed for that purpose, and if found not to be suffering from any suspicious disease he may be registered. He should then turn in his effects for disinfection and await in a building provided for this purpose the return of his disinfected belongings. He should then change his clothing and submit for disinfection the suit worn upon arrival. This being completed, he may finally be admitted to the main camp, and no further disinfection required, unless he subsequently develop disease in his own person. It is advisable that invariable rules should obtain in all camps, and, as nearly as may be, all persons treated exactly alike and concessions made to none."

The plan of the camp at Brunswick is shown in Fig. 70.

When a place is infected it has of late years been the custom of the marine hospital service to maintain a train inspection on the roads leading out. The following is from a report by Surgeon Glennon:[1]

"The object to be attained is to ascertain that no person ill or suspected dangerous is allowed to depart from an infected city or town, and also that passengers are under surveillance while en route to destination.

"I attained the first object this year at Mobile by stationing a competent physician at the union depot in that city, who personally examined all would-be departing passengers and obtained a signed declaration of their residence, non-exposure to infection, and number of pieces of baggage. To this declaration was attached the inspector's certificate of examination of the bearer and disinfection of baggage. By an arrangement with the railroad companies box cars were located near by, for disinfection of baggage, railway mail, express packages, and other matter. Ordinary shipping tags were attached marked "Disinfected," signed, and stamped with the seal of the marine hospital service. This baggage went through to all points without trouble, though I learned that baggage from other points was overhauled along the line.

"The second object was attained by placing a competent physician upon each departing train, to examine the passengers en route, who were persons from New Orleans and the infected Gulf coast towns as well; memorandum slips were taken up, completed, certificates checked up and passed on at the next relay, the inspector taking the return train at the most convenient point. In this way a double-check service was instituted.

[1] Report of Supervising Surgeon General, Marine Hospital Service (1898), p. 362.

"Pullman sleeping and upholstered cars should be discontinued, except possibly upon through trains for the north. These, together with ordinary cars, should be treated with the steam air blast, disinfected at some central point, and a dated certificate of the fact attached to each car before it is allowed to return.

"Relays of train crews should be made at not less than five miles from an infected city or town, and another preferably at the state line. It is not necessary to transfer the passengers into new coaches, the experience of this year showing that they are best detained for observation near their point of destination."

The form of declaration for travellers used by the state board of health of Alabama is shown in Appendix 114.

As has been stated in the preceding pages, local and state quarantines throughout the south have frequently forbidden the importation of any freight from an infected locality. The convention rules of Atlanta and New Orleans and the rules of the marine hospital service permit the free transportation of certain classes of freight, allow other freight to be removed after disinfection, and only absolutely forbid the carriage of a few things, such as household furniture and bedding. Personal baggage must always be disinfected. In 1897 and 1898 the marine hospital service established an inspection at many important shipping points that were infected and passed a great deal of freight that was very generally accepted by non-infected cities. In 1897 at New Orleans, 4,626 cars were disinfected by drenching with corrosive sublimate solution.

There has been much discussion as to the damage to be apprehended from the mails. In New Orleans, although it was hardly believed to be necessary, the marine hospital service disinfected the letters and newspapers and excluded all package mail. Letters were perforated and all mail exposed to steam for forty minutes and to six per cent. formaldehyde in a vacuum apparatus.[1]

[1] Report of Supervising Surgeon-General, Marine Hospital Service (1897), p. 628.

CHAPTER XIII.

REFUSE DISPOSAL.

GARBAGE.

MUCH of the material contained in the following pages is taken from reports made in 1896 and 1897 to the American Public Health Association by one of its committees. Mr. Rudolf Hering, chairman of the committee, collected a large amount of material covering nearly one thousand pages of legal cap. Unfortunately only a brief summary was published in the transactions, but owing to the kindness of Mr. Hering the writer was allowed to make use of the full report in the preparation of this volume. The attempt has been made to note the changes that have occurred since 1896, and doubtless in so doing errors have crept in. Such should be attributed to the writer and not to Mr. Hering, who took unusual pains to verify all the data he obtained.

The term garbage as used in this chapter means animal and vegetable waste matter, subject to rapid decay, from dwellings, hotels, markets, etc. It does not include slaughter-house refuse, dead animals, night soil, street sweepings, or anything else. This appears to be the most common meaning of the word throughout the United States. It is true that in some localities other words have this meaning, and in some localities garbage includes far more than the above. Thus in Connecticut and Rhode Island and to some extent in Massachusetts and other parts of New England, and also in Jacksonville and Tacoma, "swill" is used with the same meaning as garbage, and often to the exclusion of the latter term, while in the middle and western states swill, unless limited, indicates distillery refuse. In Massachusetts offal is the term usually applied to garbage. It is also employed in St. Paul. In southern cities, and popularly, though not officially, in Philadelphia, garbage is called "slops," a word which in New England means chamber refuse or any kind of filthy liquid from the house. In Atlanta, Charleston, Galveston, Macon, Ga., and in southern cities generally, garbage includes not only kitchen refuse but also papers and rubbish of all kinds. In New York City and the neighboring cities in that state and

New Jersey, garbage includes ashes as well as dry refuse and kitchen refuse: but since New York has attempted to separate the kitchen wastes from ashes, etc., the attempt is made, at least officially, to apply the term garbage to putrescible waste only.

When garbage is treated separately from ashes and other refuse it is necessary to define by rule or ordinance what is meant by garbage. It is difficult to enforce the separation of garbage from other waste material, and as the first step, it is necessary to inform the public what will be considered garbage. So too in making contracts, it must clearly be understood by both the city and the contractor exactly what is to be removed or destroyed. Garbage is variously defined: sometimes merely as "animal and vegetable waste." Usually garbage is considered to consist of waste from food material. In the District of Columbia garbage is defined as "the refuse of animal or vegetable matter which has been used or intended for food." Definitions of garbage from Pittsburgh[1] and New Orleans[2] are given below.

Most of these regulations are more concerned with specifying what shall not be considered garbage and what must not be mingled with it, than they are with making a positive definition. Very many of these rules specifically mention a great number of substances which must not be allowed to go into a garbage receptacle. Rain water is one of the things that must be kept out, and often covers are required for this purpose. Liquids, dish water and slops of all kinds are forbidden. In Fort Wayne garbage "must be drained before being put into the vessel." Ashes are the commonest form of household refuse and are therefore usually specifically excluded. Among other materials sometimes mentioned are glass, crockery, sweepings, oyster and clam shells, sawdust, cork dust, old boots or shoes, dead animals, lawn clippings, bottles, earthen, tin or iron ware, rubbish, dirt, tin cans, poisonous matter, excrement, urine, coal, and dirt.

What is excluded from garbage varies some in accordance with its final disposition. If it is to be used as a fertilizer, slaughter-house

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[1] Pittsburgh, Garbage Ordinance, Sec. 2 (15 January, 1907):

"The words 'garbage and ash,' as used in this ordinance, shall be held to include every refuse, accumulation of animal, fruit or vegetable matter, liquid or otherwise, that attends the preparation, use, cooking, dealing in or storage of meats, fish, fowls, fruits or vegetables."

[2] New Orleans, Ordinances No. 1807, Council Series:

"That the word 'garbage' as used in this ordinance shall be construed to mean house and kitchen offal, and all refuse matter not excremental, whether solid or liquid, and decomposed animal and vegetable substances, including dead animals arising from public or private premises of the city and not destined for consumption as food."

refuse and dead animals are an advantage, the more of them the better. In some cities where the garbage is reduced, and in some even where it is cremated, tin cans are made to yield a profit and are not objected to. In other places where garbage is fed to swine, cans are an incumbrance, and when garbage is plowed in, they are a positive disadvantage. Toledo and Fitchburg are examples of cities where garbage is fed to hogs and where it is forbidden to place empty tins in the garbage. The difficulty of enforcing such a rule, is probably the reason why it is not more often found. In Boston, although garbage is to some extent used for feeding, it is required that cans and bottles which have contained food shall be put with the garbage. This rule came about from the triple separation which is made in that city, the contractors declining to have cans with the dry refuse which they sort over for salable material. In Fort Wayne, though the garbage is cremated, it is forbidden to place cans in it. When garbage is cremated it is an advantage to have as much combustible material as possible mixed with it. Hence in Lowell[1] it is provided that "in the garbage vessels shall be placed all kitchen refuse, apple and potato parings, corn husks, cabbage leaves, shoes, rubbers, old bedding, soiled linen or cotton and all refuse that can be burned," and similar provisions are found in other cities. In Atlanta and other southern cities a similar practice is in vogue, and garbage is held to mean kitchen waste plus all rubbish of a combustible nature, but does not include ashes. True garbage is in these cities called slops.

In Columbus, O., Elizabeth, N. J., Rochester and St. Louis the scavengers or the contractor remove and dispose of slaughter-house refuse.

In Asbury Park, N. J., Augusta, Ga., Cleveland, the District of Columbia, Detroit, Houston, Tex., Minneapolis, New Orleans, Philadelphia, St. Louis, and St. Paul the garbage collectors remove dead animals.

The following is the weight of a cubic yard of garbage as reported by various cities:

WEIGHT OF GARBAGE.

Asbury Park	one	cubic	yard,	weight	1,472	pounds.
Boston	"	"	"	"	1,100	"
Brockton	"	"	"	"	1,500	"
Buffalo	"	"	"	"	1,250	"
Cambridge	"	"	"	"	1,688	"
Cleveland	"	"	"	"	1,600	"
District of Columbia	"	"	"	"	1,512	"
Evansville	"	"	"	"	1,000	"
Lowell	"	"	"	"	1,241	"
Lynn	"	"	"	"	1,500	"

[1] Lowell, Rules and Regulations of Board of Health (1897), p. 35, Sec. 1.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,500	pounds
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,800	"
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,500	"
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,200	"
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,200	"
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,500	"
Average					1,450	"

The weight of garbage of course varies according to its character and the amount of other refuse and the amount of water contained in it, but the average weight given above is probably not far from correct.

In some cities garbage is collected only from private residences and not from hotels, restaurants, stores and markets. Many other cities, while ready and willing to remove garbage from hotels, do not do so but permit its removal by private parties. Hotel garbage is more desirable for feeding to swine than is garbage from private houses, and perhaps in the majority of cities a considerable part of the hotel garbage is removed by private parties to be used for that purpose. Such garbage usually has a small market value. The farmer may pay a small amount of cash for it or in many instances he furnishes to the hotel the products of the farm at a reduced price. In Providence the garbage from the principal hotel is sold for about $200. A few years ago a single hotel in New York City received $1200 a year from the sale of its garbage, but now has to give it away. It is sometimes claimed that the city has no right to prevent such a sale of garbage to private parties, but the writer has heard of no decision on this point: but such sale sometimes results in nuisance, owing to the carelessness of the private contractor, and occasionally, as in Lynn, the disposal of any garbage to private parties is forbidden. There are not many such cities, however, as the municipality is usually glad to be rid of a part of the expense of garbage removal.

It more often happens that a city refuses to remove the garbage from hotels and markets. There is, of course, no just reason for such refusal and it is only refused on grounds of economy. The removal of garbage from stores, markets, produce commission houses, and the like is usually considerable of a burden and some cities are glad to escape it. It is argued that the waste accumulated in such places is the result of business venture and the cost of removal should be a burden on the business, and provided for as any other business outlay. Such a reason is no reason at all, for the paramount argument for the municipal removal of garbage is the prevention of nuisance, municipal removal being the only means by which nuisance can be avoided. This the writer well knows, for in his own city the market men and produce dealers are

obliged to get rid of the refuse themselves, and they promptly deposit decaying fish and vegetables on the nearest dump, evading the police and other inspectors with great ingenuity. There is another reason than that of economy in collection, which leads cities to decline the refuse of markets, and that is the difficulty of disposal. Market refuse rarely consists of pure garbage, i. e., putrescible materials, but is mixed with sawdust, paper, etc. It will not do to place it on a dump, and it is not desirable to put it in garbage that is to be fed to swine. In Chicago the contractor is not required to remove garbage from hotels containing over twenty persons. In Cincinnati, Dayton, Davenport, Ia., Fort Wayne, Muncie, Ind., Rockford, Ill., Springfield, Mass., and Minneapolis, the public garbage service is not extended to hotels. In Evansville, Fort Wayne, Pawtucket, Providence, and Wheeling markets and produce dealers are obliged to dispose of refuse at their own expense and in their own way. In Philadelphia decayed fruits and vegetables are not collected by the contractor, but must be disposed of when delivered at reduction works. In Rochester all such refuse is removed by the health department, but markets and produce dealers pay to the city a nominal sum for the service. In Boston produce dealers are required to remove their garbage to the scows at their own expense and are charged for the privilege of depositing it. In 1898 $1,314.55 was received from this source.

It has usually been considered best by municipal authorities, and indeed by sanitary officers, to collect and dispose of garbage separately from other forms of refuse. There are several reasons for this. Garbage is the most offensive form of a city's wastes and the necessity for its removal is the most pressing. If it is kept separate from ashes there is a less bulk to be moved, and the expense is therefore less. For most cities it is easier to dispose of pure than mixed garbage, for the former may be fed to hogs, while the latter is usually placed on a dump to the annoyance of many. Lastly, it is only when garbage is kept separate that it can be utilized. Feeding to hogs has long been the moving cause for separate garbage collection, and of late years the promise of the recovery of a part of the value of garbage by reduction processes induced so able a sanitary officer as the late George E. Warring, Jr., to advocate separation of the different varieties of a city's wastes. The cities named below[1] require the separation by the householder of garbage from other forms of refuse.

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[1] Adrian, Mich., Albany, Allegheny, Asbury Park, Atlanta,* Atlantic City, Augusta, Ga.,* Auburn, N. Y., Baltimore, Boston, Bridgeport, Brockton, Brooklyn, Buffalo, Cambridge, Camden, Chelsea, Cincinnati, Cleveland, Columbus, O., Davenport, Ia., Dayton, Denver, Detroit, Dubuque, Erie, Evansville, Everett, Mass., Fall

The rules requiring the separation of garbage from other refuse are enforced by fines, as are other similar regulations, and obedience is also secured by relieving the contractor or city employee from the duty of removing the garbage when it has improper substances in it, or when in any other manner it is offered for collection in violation of the rules prescribed. This is quite a common provision, but in some cities, as Asbury Park and Buffalo, it is required that the contractor shall at once report the fact to the health department. In Asbury Park a separate slip is sent to the health department for each case, on which is stated the reason why the garbage was not removed.

Garbage Receptacles.

The garbage receptacle, especially when separation of true garbage is made, is usually one of the commonest forms of nuisance to be found. Every garbage can, unless it is emptied daily and thoroughly washed after emptying (which is practically never done) is in hot weather sure to be offensive. The annoyance from it can probably never be entirely done away with, and it is only with great care, and at some expense, that it can be reduced to a minimum.

Nearly every city requires that the householder shall provide a water-tight covered receptacle to hold garbage. The rule from New York City, shown below,[1] has served as a model for many others. In Min-

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River, Findlay, O., Fitchburg, Galveston,* Hartford, Haverhill, Holyoke, Indianapolis, Jackson, Mich., Jacksonville,* Jersey City, Kansas City, Kingston, N. Y., Lawrence, Lowell, Lynn, Macon,* Malden, Manchester, Melrose, Mass., Memphis,* Meriden, Milwaukee, Minneapolis, Montclair, N. J., Muncie, Nashville, New Bedford, New Brighton, Newburgh, New Haven, New London, Newport, Newton, New York, Oakland, Cal., Omaha, Paterson, Pawtucket, Philadelphia, Pittsburgh, Portland, Me., Portland, Ore., Poughkeepsie, Providence, Pueblo, Colo., Quincy, Ill., Richmond, Va.,* Rochester, St. Louis, St. Paul, Salem, Salt Lake City, San Jose, Savannah,* Sioux City, Somerville, Mass., Springfield, Mass., Springfield, O., The District of Columbia, Toledo, Trenton, Utica, Wheeling, Wilkesbarre, Wilmington, Del., Worcester, Yonkers.

* In most southern cities combustible refuse and garbage are collected together, but separate from ashes.

[1] New York, Sanitary Code (1899), Sec. 116:

"That it shall be the duty of every owner, tenant, lessee, and occupant of any and every building, or place of business in the generally built-up portions of the City of New York, forthwith to provide or cause to be provided, and at all times thereafter to keep and cause to be kept and provided within such building, or place of business, suitable and sufficient boxes, barrels or tubs for receiving and holding without leakage, and without being filled to within four inches of the top thereof, all the ashes, rubbish, garbage, and liquid substances, of whatever kind, that may accumulate during thirty-six hours, from said building or place of business, or the portion thereof of which such person may be the owner, tenant, lessee, or occupant."

neapolis the manager, proprietor and agent are made responsible. In Chicago and Cincinnati the ordinance requires that the owner shall provide the receptacle when a house contains more than two tenements. In St. Louis where private scavengers collect from hotels, they must furnish two sets of receptacles to avoid transferring the garbage in the street. In Grand Rapids where the garbage is collected by private scavengers at the owner's expense, the contractor or licensee is obliged to furnish the receptacles.[1] The rule shown below[2] is found in the act establishing a bureau of health in Pennsylvania cities of the second class.

Of about 100 cities from which reports have been received on this subject, the following have no regulations in regard to the garbage receptacles: Galveston, Macon, Malden, Mass., Manchester, N. H., New Brighton, N. Y., Newburgh, Newton, Pawtucket, Portland, Ore., Poughkeepsie, Springfield, O., and Toledo. All the others require water-tight receptacles for garbage, and nearly all require that they shall be kept covered. In Pennsylvania cities of the second class garbage receptacles must "be perfectly water-tight and so kept" and be "provided with a tight fitting cover, which cover shall not be removed except when absolutely necessary." It is a difficult matter to enforce the rule about covering garbage receptacles, and according to the observations of the writer in his own and other cities, it is much more often violated than obeyed. It is perhaps for this reason that a few cities, although requiring tight garbage receptacles, do not reqire that they shall be covered, as Atlantic City, Brooklyn, and Davenport, Ia. In Detroit the covers must be hinged. In the District of Columbia the cover must be provided with a handle. Receptacles must be provided with handles in Asbury Park, Buffalo, Chicago, the District of Columbia, Kansas City, Pennsylvania cities of the second class, and Salt Lake City, and usually it is specified that there shall be two handles, one at each side.

The size of the receptacle is not usually regulated. In Brooklyn, New York, Jersey City, and Memphis, it must be large enough to contain the garbage made during thirty-six hours. In Cleveland it must be large enough to contain forty-eight hours' garbage, and in Yonkers it

[1] Grand Rapids, Ordinance of 18 July, 1898, Sec. 5.

[2] Pennsylvania, Chapter 258 of 1895, Sec. 20:

"The bureau of health shall cause a printed notice to be left at each and every hotel, tavern, eating house and dwelling house in the city, stating that a scavenger will call for offal, garbage and swill at certain times mentioned in the notice, and requiring that such offal, garbage and swill be ready in prescribed and suitable vessels for the scavenger when he calls for the same, and a copy of this section shall be appended to such notice."

[illegible] [illegible] [illegible] [

the moist garbage, but very serious nuisance results from the absence of covers. The uncovered garbage barrel is not only offensive, but cats and dogs scatter its contents about the yard, and it receives large amounts of rain and snow which very much increase the cost of either cremation or reduction. Theoretically, wooden receptacles are not so good as metal, but unless the latter are emptied daily and washed out, conditions never fulfilled, the metallic ones soon become nearly as offensive as those made of wood. A common form used in Providence is a beer keg. It is durable, tight, and will not be destroyed in winter, it is not readily tipped over by dogs, and if it has an iron cover is secure from all animals. The scavengers, however, object to it on account of its weight. Sometimes the garbage pail is kept in a small house or box built for that purpose, but the experience of the writer is that this also soon becomes filthy and offensive.

It is, of course, clear that if garbage pails could be emptied and washed daily they could be really kept clean. Otherwise to talk about a clean garbage receptacle is absurd. For this reason, there are few regulations as to how garbage receptacles shall be kept, but in Asbury Park the owners of garbage receptacles "shall cause the same to be kept clean," and in "good repair," and in Minneapolis they shall be "emptied and cleansed as often as may be necessary to prevent such receptacles or the contents thereof from becoming a nuisance;" but the same ordinance, perhaps because it was realized that the foregoing was impracticable, requires that the receptacle shall be placed in a position "as remote as possible from any surrounding dwellings and not less than twenty-five feet from any adjacent street." In Buffalo it is required of the contractor that "From May 1st until October 31st, all garbage receptacles, when emptied of contents, shall be thoroughly disinfected before they are returned to the premises, and such disinfecting shall be done as directed by and to the satisfaction of the commissioner of health." A similar requirement is found in Erie.

There is no use in providing garbage cans unless all garbage is kept in them and not thrown into the yard or around the can. Hence the District of Columbia[1] rule requires that

"occupants of any dwelling house, apartment or tenement house, and each proprietor of any boarding house, commission warehouse, hotel, restaurant, and other place where garbage is accumulated, shall cause all garbage from his or her premises to be put in the receptacle provided for that purpose,"

and in Providence[2] no

"swill, garbage or offal shall be placed in any receptacles for ashes or rubbish, or deposited in any yard or vault other than its proper receptacle."

[1] District of Columbia, Police Regulations, Art. XIV., Sec. 3.

[2] Providence, Rules of the Board of Aldermen (1899), Chapter 1, Sec. 16.

In that city whenever improper substances are put in the garbage, a printed copy of the rule is given to the householder.

Trouble sometimes results from persons overhauling garbage after it has been placed in the alleys or other accessible places, looking for junk, or perhaps for the best of the garbage itself to take away for their own use. Hence the following rule in the District of Columbia:[1]

"No person other than the owner or authorized collector shall interfere with or disturb any garbage after it shall have been put in a garbage receptacle and placed in an accessible place for collection; nor shall any unauthorized person molest, hinder, delay, or in any other manner interfere with any garbage collector in the discharge of his duty."

A similar regulation forbidding molestation of the garbage or upsetting it or scattering it upon the street is found in Atlanta, Charleston, Chicago, Cincinnati, Grand Rapids, Memphis, and Pennsylvania cities of the second class.

Location of Garbage Receptacles.

The fact that a garbage pail is a nuisance and that therefore its location should be as far from dwellings as possible, has only been recognized so far as the writer is aware in Minneapolis, as shown on page 673; but in Bridgeport, Camden, District of Columbia, New Haven, Providence, Rochester, and Yonkers they must be placed where the board of health or its inspectors direct, though in Rochester[2] the position is not to be fixed by the board of health if "they are kept within or upon the private grounds of residences and sufficiently removed from adjoining premises to prevent any offense thereto." In those cities in which it is required that the garbage pails be placed outside of the premises it is intended and often specified that they shall be so placed only on the days for collection, and in Buffalo they must be taken in from the curb line within one-half hour of the time they are emptied.

The most important practical consideration in regard to the location of garbage receptacles is whether they shall be kept on the premises or placed on the sidewalk. In a general way it may be said to cost more to remove garbage from the yard than from the curb, but the conditions may sometimes be such that one is as cheap as the other. The length of haul may for instance prevent the collection of more than two loads in working hours, even if the collection is made from the curb, and yet the margin of time may be sufficient to permit of the collection of the two loads from the premises. In Chelsea, Mass., it costs twenty-five per cent. more to collect from the rear of the house than from the side-

[1] District of Columbia, Police Regulations, Art. XIV., Sec. 8.

[2] Rochester, Ordinances of Board of Health (1895), No. 23.

walk, but the citizens insist upon the former. In Boston this practice is followed, but is considered too expensive. In Cincinnati on the other hand, where the practice is to place them on the sidewalks, it is not considered satisfactory.

The cities named below[1] provide that the receptacles for garbage shall be placed on the sidewalk for the convenience of the scavengers.

In Colorado Springs, Kansas City, Toledo, and Chicago, the garbage is to be placed in the alley in the rear, if there is one. In Cambridge it is to be placed outside the premises in the summer but not in the winter. In Detroit, while outside the lot line, the receptacles must not be over two feet from it, and in Allentown, Pa., and in Paterson they must be set at the curb.

In most cities the garbage pail must be kept on the premises.[2] In Boston, Milwaukee, New Haven, the District of Columbia, and St. Paul it is provided that the receptacle must be kept in an accessible location. Scavengers are not expected to go up stairs or down cellar for it.

In Denver, Fort Wayne, Omaha, Pueblo, and St. Louis it may be placed either just within or just without the street line; but in Atlanta, Cleveland, Erie, New Brighton, and Pennsylvania cities of the second class it must be kept in rear of the house, or, in the latter cities, in areas or passageways. In Macon it must be set on the premises near the gate.

It is more economical for the scavengers to carry a pail to the receptacle when the latter is on the premises and to empty the receptacle into the pail than it is to carry the private receptacle to the wagon and return it. By the use of a carrying pail one trip is saved at each house, and this is the more common method of collection, but it is sometimes forbidden, as in Asbury Park. In such cases it is supposed that the scavengers will return the receptacle to the place where found, and this is specified in some of the rules, as in the one given below.[3]

[1] Camden, Colorado Springs, Cambridge, Chicago, Cincinnati, Detroit, Fitchburg, Galveston, Holyoke, Kansas City, New London, New York, Paterson, Reading, Sioux City, Springfield, O., Toledo, and Utica.

[2] Allegheny, Asbury Park, Atlanta, Atlantic City, Auburn, Battle Creek, Boston, Bridgeport, Buffalo, Chelsea, Columbus, Dayton, District of Columbia, Erie, Fall River, Grand Rapids, Hartford, Indianapolis, Jackson, Mich., Lowell, Lynn, Milwaukee, Minneapolis, New Bedford, New Brighton, Newport, Newton, Pawtucket, Providence, Philadelphia, Pittsburgh, Richmond, Quincy, Ill., Rochester, Salem, Savannah, Somerville, Springfield, Mass., Syracuse, Wheeling, Wilmington, Del., and Worcester.

[3] Buffalo, Contractors' Specifications for Removal of Ashes and Garbage:

"Receptacles containing material shall be removed from premises, placed at curb line by contractor, and contents unloaded into wagons within a reasonable length of time, which shall not exceed one (1) hour after receptacles are placed at curb in front of premises, and the receptacles shall be returned to the place on premises from which they were removed within one-half (½) hour after they are emptied."

Frequency of Removal.

The frequency of removal of garbage varies in different cities, though it is rarely moved less often than once in a week.

The only city in which garbage is collected seven times in a week is Washington. In other parts of the District of Columbia it is collected less often.

It is collected six times a week during the entire year in Adrian, Mich., and Allegheny, Macon, Ga., New York City, Philadelphia, and Savannah; from 15 May to 15 October in Brookline; from 15 June to 15 September in Asbury Park, N. J.; from 1 April to 20 November in the centre of city in Dubuque, Ia.; in the summer time in Atlantic City, Davenport, Ia., Denver (in centre), Colorado Springs (in centre, May–October[1]), Norfolk, and Richmond, and in the central districts of Buffalo and Chicago, Columbus, Cincinnati, Detroit, Manchester, N. H., Milwaukee, New Brighton, Pittsburgh, St. Paul, Salt Lake City, and Quincy, Ill.

Garbage is collected four times a week in Newport, R. I., from May to September.

The most common method is to collect the garbage three times each week. This is followed in Newburgh, New London, Ct., and in San Jose, Cal., all the year round and in all parts of the city. It is collected in certain districts three times a week in Detroit, Hartford, Chicago, Cincinnati, Columbus, Quincy, Ill., Pittsburgh, Manchester, New Brighton, St. Paul, and Toledo. The garbage is collected three times a week in the winter in Atlantic City, Norfolk, and Richmond: three times a week in the summer in Brockton, Mass., Cambridge, Colorado Springs, Galveston, Holyoke, Kansas City, Lynn, Malden, Paterson, Sioux City, Somerville, Mass., Utica, Worcester, and Wilmington, Del.; from 15 November to 15 June in Asbury Park, N. J.; from 21 November to 30 March in the suburbs of Dubuque, Ia.; from November to April in Newport, R. I.; from June to September in Bridgeport; from May to October in Brooklyn and New Bedford; from 16 July to 15 October in Camden; from April to November in Cleveland and Chelsea, Mass.; from 15 April to 15 November in suburbs of the District of Columbia; from May to September in Haverhill; from April to October in Providence, Fall River, and Pawtucket; from April to September in Newton, Mass., and St. Louis; from May to November in New Haven; from April to November in Evansville.

Garbage is collected twice a week all the year around in all parts of the city in Allentown, Pa., Fitchburg, Lowell, Portland, Ore., Salem,

[1] In all these periods both months are included.

Springfield, Mass., Springfield, O., Tacoma, and Wilkesbarre. It is collected twice a week in certain parts of Chicago, Cincinnati, Columbus, Quincy, Ill., Pittsburgh, Hartford, and Toledo. Garbage is collected twice each week in the summer in Boston, Dayton, Erie, Pa., Muncie, Ind., Rochester, Utica; New York City from May to October, in Bridgeport, Brockton, Buffalo (except in centre), and Cleveland; in the winter in Cambridge, Holyoke, Malden, Mass., Paterson, Sioux City, Somerville, Mass., Utica, Wilmington, Worcester; from November to April in Brooklyn, New Bedford; from 26 October to 15 July in Camden, from December to March in Chelsea; from 16 November to 20 March in the suburbs of the District of Columbia; from October to April in Haverhill; from December to April in New Haven; from October to March in Newton, Mass., and St. Louis; from November to March in Providence, Pawtucket, Fall River, and in the spring and autumn in Kansas City; in June, July and August in Lambertville, N. J.; from December to March in Evansville.

Garbage is collected once a week at all seasons and in all parts of Battle Creek, Mich. It is collected once a week in certain parts of Denver and Colorado Springs, and from residences in Salt Lake City all the year. It is collected once a week in the winter from all parts of Boston, Muncie, Ind., Kansas City, Dayton, Rochester, and Davenport, Ia. It is collected once a week from December to March in Auburn, N. Y.; from November to March in Erie; from November to April in Bridgeport, Buffalo, and Cleveland. It is collected once a week in the summer from Rockford, Ill. In Rockford, Ill., in winter not over a load is allowed to accumulate. In Dubuque, Ia., municipal collection ceases entirely in the winter.

From the foregoing it will be noticed that very few cities collect garbage every day, and of these several are southern cities. A number of cities make a distinction as to frequency of collection in different sections, collecting it oftener in the central portions. Such are Buffalo, Chicago, Cincinnati, Columbus, Denver, Detroit, District of Columbia, Dubuque, Ia., Hartford, Milwaukee, New Brighton, Pittsburgh, St. Paul, and Salt Lake City. A majority of the cities collect the garbage more frequently in the summer than in the winter, and it is usually done three times a week in the summer and twice in the winter.

Unless garbage is collected daily, it is necessary to divide the city into districts, certain scavengers collecting in certain districts on certain days. A practical difficulty is thereby developed, which in Providence, at least, is the cause of much complaint. It is evident that with tri-weekly collections, certain houses must each week be neglected from Friday until Monday. As this in the long run would happen to a given

individual not more than once in three weeks, it would appear not to work a great hardship; but from the fact that the seeming neglect is apparently sporadic, it causes just so much the more friction.

Only a few cities make no distinction in frequency of collection in different seasons.[1]

In a number of cities garbage is collected more frequently from hotels and restaurants than it is from private houses. Usually it is collected daily from all such.[2] Garbage is collected daily from markets in Auburn, Buffalo, Chelsea, Somerville, and Tacoma.

Hours for Removal.

In most cities the garbage, when collected separately, is collected during the day time, the period extending over the whole working day. In a few cities collections are made at night. In Buffalo it is collected from the business district between 6.30 P. M. and 5 A. M.; Portland, Ore., between 9 P. M., and 8 A. M.; in St. Paul, between 12 P. M. and 9 A. M.; in Elmira, during June, July, August, and September, between 6 P. M. and 9 A. M. In Spokane, it is collected from 10 P. M. to 10 A. M. from 1 April to 1 October, and from 10 P. M. to 11 A. M. during the rest of the year. In Ridgewood, N. J., garbage is collected at night.

In other cities it is collected early in the morning. In Asbury Park it is collected from the business section before 9 A. M., also in Norfolk; in Salt Lake City, before 8 A. M. In Milwaukee it is collected between 4 A. M. and 2 P. M. In Asbury Park, Boston, and Buffalo it is collected from hotels early in the morning.

In New Orleans and Wilmington, Del., the scavengers must ring a bell at each corner loud enough to be heard the length of the block, and in Erie they must give notice of their approach. In Philadelphia the contractor is to frequently call out "slop." In Pennsylvania cities of the second class, "warning of their approach shall be given by the sounding of a horn at each street corner and at the middle of each block."[3]

Vehicles for Garbage Removal.

All the cities reporting except Cincinnati, Savannah, and Springfield, O., have some regulations in regard to garbage wagons. If there are any regulations at all, they invariably require that the wagons shall be

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Adrian, Mich., Allegheny, Allentown, Pa., Battle Creek, Fitchburg, Lowell, Macon, Newburgh, New London, New York City, Philadelphia, Portland, Ore., Salem, San Jose, Cal., Savannah, Springfield, Mass., Springfield, O., Tacoma, Wilkesbarre, and Wilmington, Del.

[2] Battle Creek, Boston, Bridgeport, Brooklyn, Buffalo, Chelsea, Detroit, Denver, Evansville, Haverhill, (if they have five guests), Kansas City, (in summer), Lynn, Nashville, Portland, Ore., St. Louis, Somerville, Tacoma, and Utica.

[3] Pittsburgh, Garbage Ordinance (1895), Sec. 4.

tight or water-tight. They also require that the wagons shall be covered. The only cities where this is not the practice are Lambertville, N. J., Portland, Ore., Springfield, O., and Savannah. Usually it is specified that the cover shall be wood or metal to correspond with the cart, but canvas covers are permitted in Atlanta, Asbury Park, Bridgeport, Buffalo, Cincinnati, Richmond, San Francisco, Scranton, and Springfield, Mass. It is sometimes specified that the covers must be kept on except during the actual loading of the garbage, as in the District of Columbia and St. Louis.

In some cities wooden wagons or carts are used for the collection of garbage. The only regulation for their construction beyond those above given, and that the writer has seen, is in Omaha where the garbage wagons, if of wood, must be one and one-half inch tongued and grooved pine stock. Metal carts are either required or are used in the cities named below.[1] They are invariably preferred to wooden carts as it is easier to keep them tight, and in the end they are more economical. The only objection to metal carts was made in Lowell where a certain style of cart, the Flanagan, was considered too heavy and clumsy. In Atlanta the wooden garbage carts are made by the city at a cost of $40. In Providence the contractor builds his own wagons which have metal bodies. They hold from two to three tons and cost about $300.

No facts were obtained to show whether dump carts and wagons are chiefly used, or those from which the contents have to be shoveled. It is the impression of the writer that dump carts and wagons are preferred. They render the handling easier, but in many cases this may not decrease the number of employees or the cost. The objection to dumping carts is that if properly constructed they cost rather more than those that do not dump. It is bad to have any sort of opening or movable tail-board in a garbage cart, as it is almost impossible to keep it water-tight.

The number of horses used with a garbage wagon is usually either one or two, though sometimes, as in Brooklyn and Providence, three horses are used with some of the wagons. As regards the use of single or double teams, the cities are about evenly divided.

In most cities either one or two men go with each wagon, and here again the cities are about evenly divided as to practice. In Brooklyn four men go with each wagon, in Cincinnati and Chelsea three, and in Providence sometimes three. The writer has not learned that any

[1] Allegheny, Asbury Park, Atlantic City, Boston, Buffalo, Camden, Cleveland, Columbus, Davenport, Denver, Detroit, District of Columbia, Erie, Evansville, Fall River, Fort Wayne, Lynn, Milwaukee, New London, New Orleans, New York, Norfolk, Pawtucket, Philadelphia, Pittsburgh, Providence, Trenton, Wilmington, Del., Yonkers.

scavengers are uniformed except in Asbury Park where they are required to wear duck suits.

A few cities make use of barrels for the collection of garbage. In Lowell they are used by private scavengers, and in St. Louis, Bridgeport, Rochester, and the District of Columbia they are employed in municipal work, but not exclusively. In Haverhill, New Bedford, New Haven, Muncie, Ind., and Syracuse they are used exclusively for municipal collection. In the District of Columbia and Muncie, metal barrels are used of thirty gallons capacity in the District of Columbia, and forty-three gallons in Muncie. In the latter city eight barrels are used on each wagon. In New Bedford each two-horse wagon carries eight to thirteen kerosene barrels; these are provided with galvanized iron covers which come down eight inches over the barrel. The barrels last about one season.

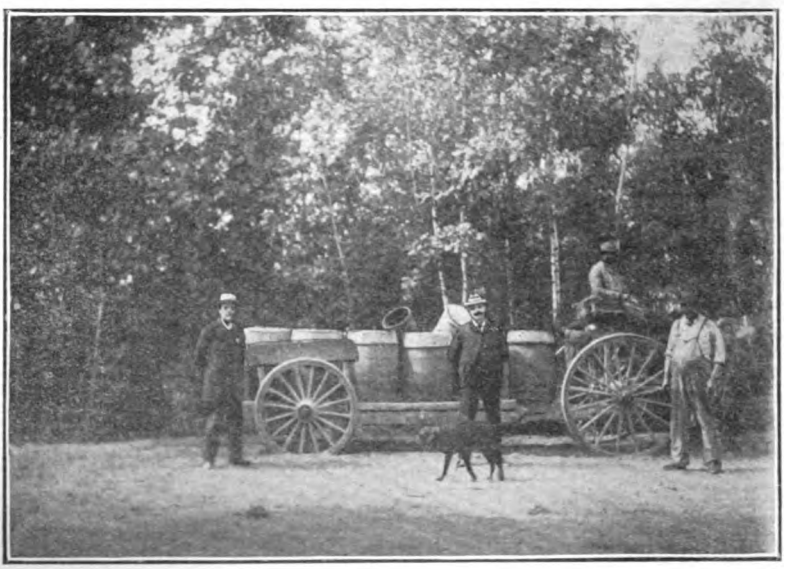

FIG 71.

Garbage Wagon, New Bedford.

In Syracuse barrels and covers like those in New Bedford are used. They have an iron handle on each side. Ten of these are carried on a two-horse wagon with two men. They hold 350 pounds of garbage each. When seen by the writer, they appeared to be satisfactory; all the covers were on and very little garbage was dropped between them, but they are to be given up for metal wagons. In Haverhill and Bridge- the wooden barrels have wooden covers which are provided with s and fastenings, though plain kerosene barrels costing ninety

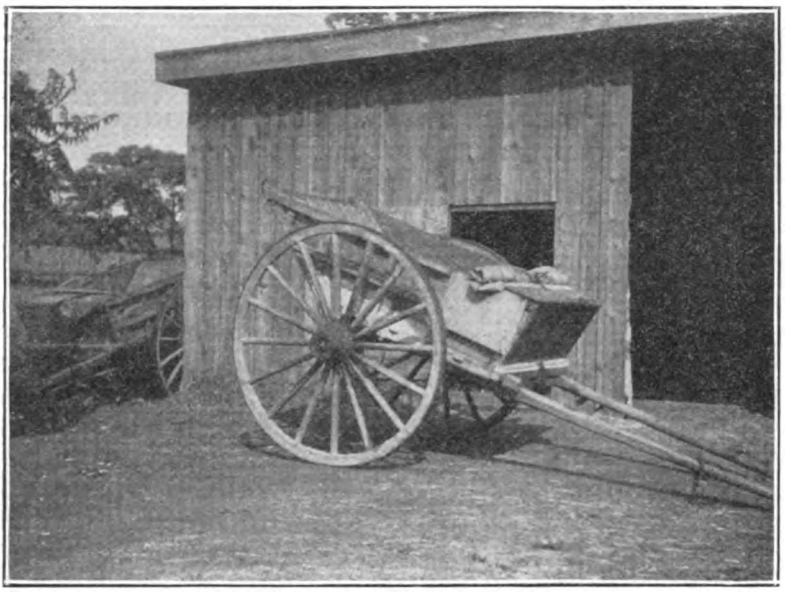

FIG. 72.
Garbage Cart, Richmond. Cost, $75. Capacity, one cubic yard.

cents with covers not fastened have been used in the latter city, but box wagons are preferred. In New Brighton and Haverhill some trouble is experienced from the dropping of garbage between the barrels, and in Haverhill in keeping the covers on. In that city, in order to secure better results, it is proposed to put one man only on each wagon in order to fix responsibility for its condition. Collection in barrels in Haverhill is found to be more expensive than collection in box wagons.

In Lowell many private scavengers use barrels. Some are like those used in New Bedford with deep galvanized iron covers and others have covers which are screwed down like those of night soil tubs. Screw covers are also used in St. Paul. Yonkers has abandoned this method in favor of metal carts.

The ideal way to collect garbage would be to remove the receptacle with its contents, replacing it with a clean and empty one. This is, of course, too expensive to be practical, but it is sometimes required for fish market or other especially offensive offal.[1] A similar rule is in force in Fort Wayne in regard to hotels.

[1] Asbury Park, Sanitary Code (1897), Sec. 34:

"In the case of fish markets, no fish refuse or other offal shall be emptied from the receptacle in which it is stored, but both offal and receptacle shall be removed from the premises and transported together outside of the city, and the said receptacle shall not be brought back into the city until it has been made clean and odorless.

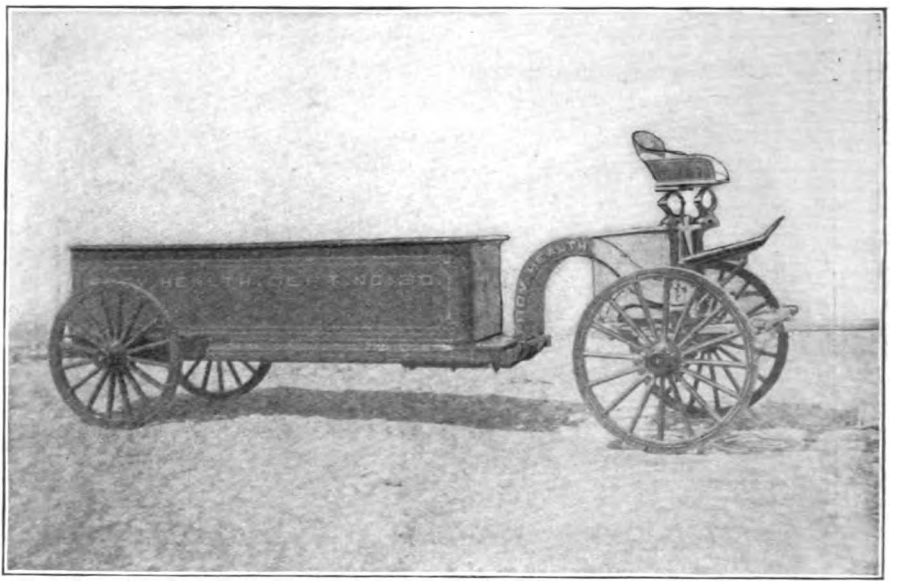

FIG. 73.

New Style Metal Garbage Wagon, Providence. Cost, $300.

FIG. 74.

Old Style Wooden Garbage Wagon, Providence.

There is nothing to be gleaned from a study of the data given, to show the most economical number of men and animals, or size of vehicle to be used in collecting garbage. The number of horses and also the number of men to a certain extent, depend upon the size of the wagons. The following shows the size of vehicles used in a number of cities:

Asbury Park	48 cubic feet.	District of Columbia	37 cubic feet.
Atlantic City	51 cubic feet.	Lowell	75 cubic feet.
Boston	57 cubic feet.	Newton	60 cubic feet.
Brockton	32 cubic feet.	Pittsburgh	54 cubic feet.
Buffalo	4 cubic yards.	Providence	74 to 96 cubic feet.
Denver	3 cubic yards.	Rochester	128 cubic feet.
Detroit	52 cubic feet.	Salem	42 cubic feet.

In Buffalo it is required that the garbage and other refuse wagons be of a uniform size and multiples of one cubic yard.

The cost of garbage carts and wagons varies from $40 in Atlanta to $350 in Paterson. As a rule the cheapest carts are used in the south and the most expensive wooden wagons in New England. Metal wagons and carts are, as a rule, more expensive than those of corresponding dimensions made of wood.

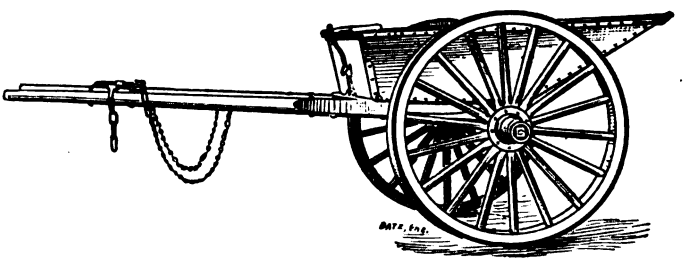

FIG. 75.

Hill Dump Cart.

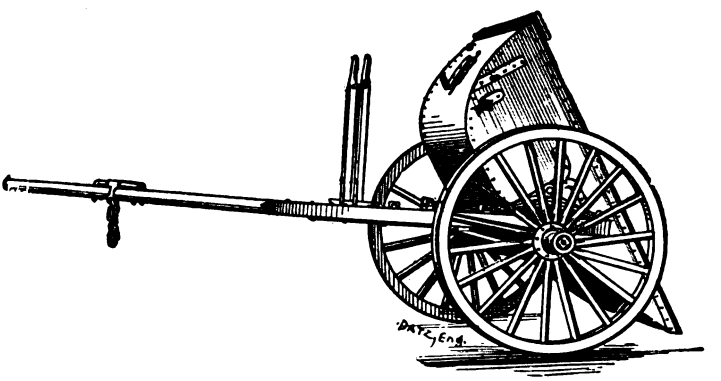

FIG. 76.

Hill Dump Cart (upset).

A cart used in the city of New York and neighboring cities for separate and mixed wastes and other purposes is shown in Figs. 75–76. It is made in various sizes by Thomas Hill, 48 Railroad Avenue, Jersey City. A cart holding thirty-five cubic feet costs about $115, with covers $10 more. A wagon somewhat similar to this cart is quite popular, and the style used in Boston is shown in Fig. 82.

The cart used in the District of Columbia, Wilmington, Del., Portland, Me., and other cities is shown in Fig. 77. It is made by the United States Sanitary Co., Washington. A cart holding thirty-seven cubic feet weighs 1,300 pounds and costs $175. A fifty-four-foot cart weighs 1,500 pounds and is sold at the same price.

The wagon body shown in Figs. 78 and 79 is used in Detroit and Cleveland. In the former city they are made by the Detroit Safe Company and cost $50. They are said to be durable. They are lifted off of the wagons and put in tiers on freight cars to be removed from the city.

The wooden tip-carts used in some parts of the south, where much dry refuse is mixed with the garbage, may be seen in the illustration of the interior of the Jacksonville crematory.

The following, prescribing the care to be taken of garbage wagons, is from the District of Columbia[1] garbage rules:

"No driver, owner, or superintendent having charge or control of any cart or other vehicle for carrying garbage shall allow such cart or vehicle to needlessly remain, nor allow a needless number of such carts or vehicles to gather before any residence, building, or place of business within the city of Washington or the more densely populated suburbs thereof; nor allow any such cart or vehicle, or anything thereto appertaining, to be in a condition needlessly filthy or offensive; nor allow any such cart or vehicle, or implement used in connection therewith, to be stored or kept in any place where needless offense is given to any person or persons. No driver of any such cart or vehicle shall occupy an unreasonable length of time in loading or unloading such cart or vehicle or in passing along any alley, street, avenue, or public road; nor allow the lid or cover of such cart or vehicle to be otherwise than securely closed except as may be necessary for the loading or unloading and cleaning of such cart or vehicle."

Overloading of garbage wagons is a cause of offence and renders covers useless, and is often forbidden.[2] In New York[3] "no part of such contents or load shall fall, leak or spill therefrom." In Yonkers a garbage wagon is not to be kept within fifty feet of a dwelling. In Asbury Park two garbage wagons must not be within 600 feet of each other on the street.

[1] District of Columbia, Police Regulations, Art. XIV., Sec. 7.

[2] St. Louis, Ordinance 17216, Sec. 9:

"Said carts or wagons shall not be filled to overflowing, and the covers of said carts or wagons shall be kept closed except when the garbage is being placed in them."

[3] Sanitary Code (1899), Sec. 125.

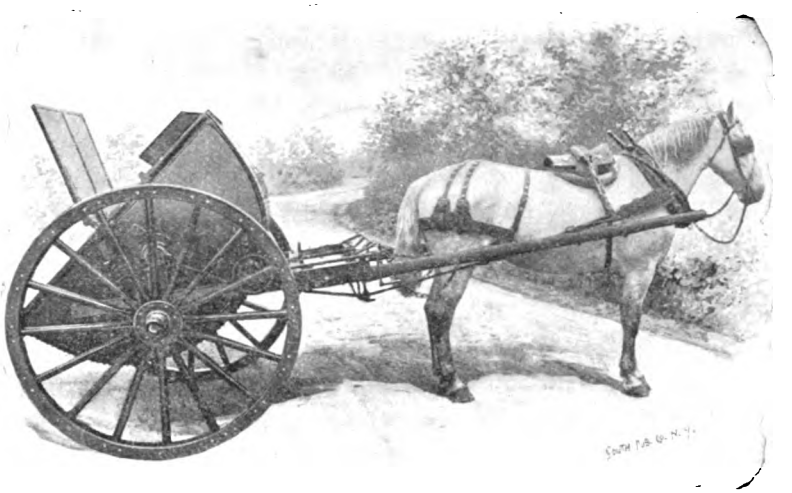

FIG. 77.

United States Sanitary Company's Cart.

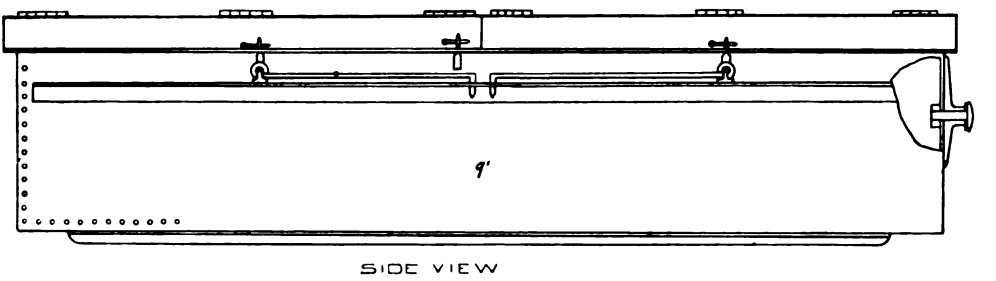

FIG. 78.

Working Drawing of Movable Body for Garbage Wagon, Detroit.

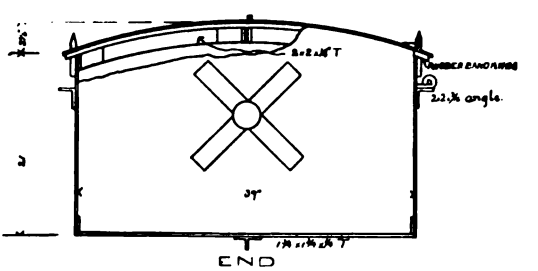

FIG. 79.

Working Drawing of Movable Body for Garbage Wagon, Detroit.

It is often one of the regulations that the wagons shall be marked "garbage cart," "garbage wagon," "licensed garbage," or "garbage," and sometimes the number and owner's name is added. The letters are usually to be four inches high, and are to be black upon a white ground. In Cambridge private garbage wagons are to have the owners' initials two inches high. In Colorado Springs the words on the cart must be legible at eighty feet. Often, as in Brooklyn, the District of Columbia, and Providence, the wagons must be inspected and approved by the health officer. Usually garbage wagons are required to be painted uniformly and of a distinctive color.

In Asbury Park the garbage wagons are owned by the city and the contractor pays a rental of fifteen per cent. per annum on their cost, and is obliged to keep them painted and in repair.[1] In Atlantic City and Fort Wayne the wagons are owned by the city; the work is let out by contract.

Garbage wagons, in order to be kept clean, must be frequently washed, and this is required to be done daily by many rules, and sometimes, as in Asbury Park, it is specified that they be washed inside and out. Mr. Hering's report showed that in nearly all cities it is required by rule, or is the custom to wash the garbage wagons daily, and in some cases after each load. The latter is the rule in Boston, Brockton, Cambridge, Dayton, Erie, Fall River, Grand Rapids, Lynn, Pawtucket, Pittsburgh, Providence, St. Louis, and St. Paul. In Kansas City and St. Louis it is said that they are washed with hot water. In Detroit they are steamed.

In a number of cities it is required that the garbage, or the wagons, or the receptacles be disinfected, but usually only in the summer time. In Buffalo the dates are from 1 May to 31 October. According to Mr. Hering's report, in Kansas City and Salem the wagons after washing are disinfected with carbolic acid, and in Tampa this is used for the scows. In Newark "Egyptian Powder" and lime are used, in Pittsburgh phenyl, and in Chicago the garbage which is collected together with ashes is said to be disinfected twice daily at the dumps with potassic permangate in solution, at a cost of thirty-three cents a ton. In Detroit the bodies of the wagons are disinfected with copperas. Lime is used for disinfection in Macon, Rochester, Utica, and Wilmington, Del., and in Newport, R. I., on the scow. In Buffalo there is attached to each garbage wagon a tank containing a solution of "dead oil" and compressed air, by means of which the driver sprays the wagon and the receptacles.[2] In Atlantic City, Boston, Cleveland, Erie, Galveston,

[1] Asbury Park, Report of Board of Health (1897), p. 24.

[2] Municipality and County, Vol. 3, p. 159.

Tex., Grand Rapids, and Lynn it was simply stated that the garbage wagons were disinfected, but no particulars were given.

It sometimes becomes necessary to transport garbage a considerable distance from the city where it is collected in order to provide for its proper disposal. Occasionally it is found most economical to do this in wagons, either those in which it is collected or in larger ones to which it is transferred. Where garbage is fed to swine or plowed in, and the distance is only a few miles, this is the usual practice. In Providence farmers find it profitable to draw it from seven to twelve miles. If the distance is great, other means have to be provided. In Providence at one time all the garbage was taken out on cars, small dump cars being used for the purpose. At present some of it in that city is carried out on flat cars. Such cars are, of course, uncovered, and the method creates considerable nuisance. In Pittsburgh the half dried garbage is removed in box cars. The best method of railroad transportation is that employed in Cleveland and Detroit. In those cities the wagon bodies in which the garbage is collected, shown on page 685, are hoisted on to flat cars, twenty-four bodies being placed on one car.

Sometimes garbage is transported by water, as in Baltimore, Boston, Cincinnati, the District of Columbia, Lynn, Newport, R. I., Tacoma, and Tampa. In Boston and Lynn such of it as is towed to sea is taken

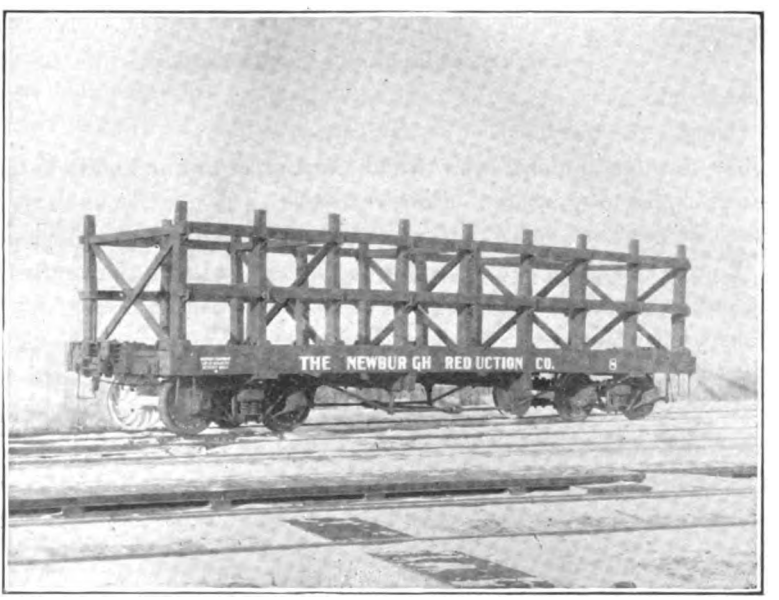

FIG. 80.

Car used at Cleveland for Transporting Wagon Bodies loaded with Garbage.

out together with the other refuse in Barney dumping scows. In Newport the scow is arranged with a slanting deck so that the load may slide off into the water. But in the other cities ordinary deck scows are used.

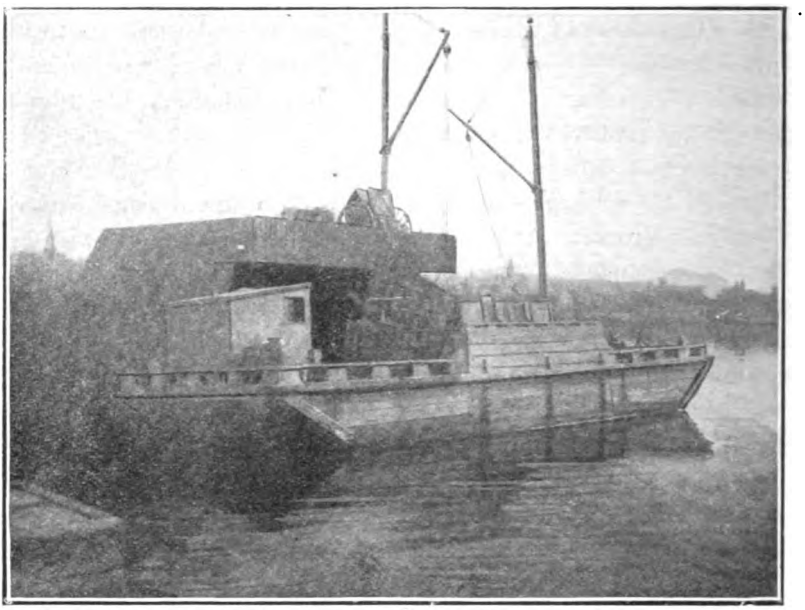

FIG. 81.

Scow for Transporting Garbage to Sea, Newport.

Collection of Garbage.

There are few general laws which authorize municipalities to collect and dispose of garbage. Power to do this is usually conferred by charters or general incorporation laws. The laws of Massachusetts,[1] New York,[2] and New Jersey,[3] do, however, provide that cities and towns may contract for the disposal of garbage, and in New York they may also collect garbage. In New Jersey[4] garbage crematories may not be built without the consent of the township in which they are to be located.

Methods of Collection.

Most cities provide for the collection of garbage at public expense. There are two ways of doing this, by contract and by the employees of

[1] Massachusetts, Chapter 377 of 1889.

[2] New York, Chapter 666 of 1894.

[3] New Jersey, Public Laws (1896), p. 56.

[4] New Jersey, Public Laws (1885), p. 822.

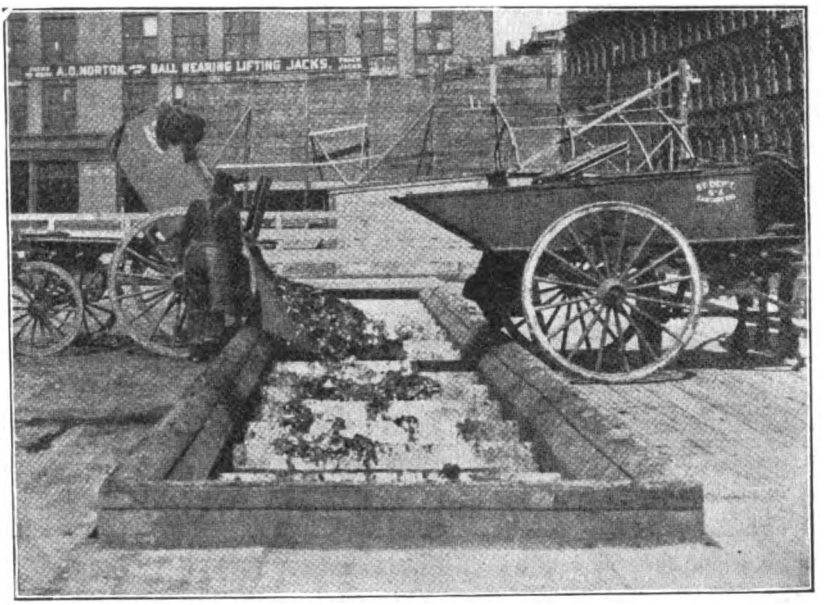

FIG. 82.

Method of Dumping Garbage onto Scows in Boston, also showing Metal Garbage Wagons. From Report of the Street Department, 1898.

some municipal department. Below is given a list of cities which provide for the collection of garbage by contract and also the department which has charge of the work.[1]

Cities which provide for the removal of garbage, ashes, and rubbish by contract usually let the contract only after advertising for bids. In

[1] Health Department. Asbury Park,* Atlantic City,* Auburn, N. Y., Augusta, Ga., Bridgeport, Brookline, Mass., Chelsea, Cleveland, Columbus, Davenport, Denver, Detroit, District of Columbia, Dubuque, Everett, Fall River, Fitchburg, Haverhill, Holyoke, Milwaukee, Minneapolis, Montclair, New Bedford, New Haven, Newport, Newton, Paterson, Pawtucket,‡ Portland, Me.,† Providence,‡ Quincy, Rockford, Ill., St. Louis, St. Paul, San Antonio, Utica, Wheeling, Wilkesbarre, and Wilmington, Del.

The director of public safety makes the contract in Allegheny, Columbus, and Pittsburgh.

The department of public works has charge in Buffalo, Evansville, Fort Wayne, Philadelphia, and Terre Haute.

The street department has charge in Boston (in certain districts, in others the work is done by city employees), Brooklyn, Hartford, Indianapolis, Manchester and New London.

In Newburgh, Rochester, and Toledo, the city council makes the contract.

* The city owns the wagons.

† Sanitary committee.

‡ Board of Aldermen, *ex-officio* Board of Health.

order to secure uniform conditions for the bids, specifications are usually furnished which describe at some length the character of the work to be done. Such specifications are issued by all the larger cities. On page 49 of the Report of the State Board of Health of New Jersey for 1897, may be found model specifications for the removal of garbage and rubbish. Good specifications may also be obtained from Buffalo and Philadelphia. Contractors are, of course, to give bonds and obey the regulations of the health department. Contractors are generally required to call daily, or oftener for complaints, and sometimes, as Augusta, Ga., and Pittsburgh, and doubtless other cities, they are required to have a telephone. The contractor frequently has a special man to attend to these complaints. In all cities which have sanitary inspectors these officers on their rounds look after the garbage collection; but some cities, as Pittsburgh, have a special inspector for this, and in Detroit there are two such inspectors.

The list below[1] gives the cities in which the garbage is collected by employees of the city and also the departments which have charge of the work.

In quite a number of cities there is no municipal collection of garbage.[2]

There appears to be a well nigh unanimous demand on the part of health officers and oftentimes of the public generally, for the municipal collection of garbage. This may be inferred from the small number and generally small size of the cities which do not thus provide for garbage collection, and also from the expressed desire of the sanitary authority of several of these cities for municipal collection. There are several stages in the development of the methods of garbage collection

[1] Health Department. Atlanta, Dallas, Galveston, Houston, Joliet, Ill., Kansas City, Mo., Lafayette, Ind., Lawrence, Lowell, Lynn, Macon, Memphis, Milwaukee, Richmond, Salem, Salt Lake City, Sioux City, Somerville, and Tampa.

Street Department. Boston (in part), Camden, and Manchester.

Street Cleaning Department. Baltimore, Cincinnati, and New York.

Overseers of Poor. Brockton, Cambridge, Taunton, and Worcester.

Board of Public Works. Evansville, Louisville (1901), New Orleans, Norfolk, Terre Haute, and Yonkers.

Superintendent of Streets. Kingston, N. Y.

Scavenger Department. Savannah.

Board of City Affairs. Dayton.

Board of Public Affairs. Springfield, O.

City Commissioner. Muncie.

[2] Albany, Altoona, Akron, Battle Creek, Bay City, Mich., Binghamton, Canton, Concord, Council Bluffs, Des Moines, Duluth, Erie, Elmira, Findlay, Fort Worth, Gloucester, Mass., Grand Rapids, Harrisburgh, Jackson, Mich., Lancaster, Pa., Meadville, Pa., Oakland, Cal., Omaha, Peoria, Plainfield, N. J., Portland, Ore., Poughkeepsie, Pueblo, Scranton, Seattle, South Bend, Ind., Sacramento, San Francisco, Tacoma, Troy, and Woonsocket.

and disposal. In small cities, villages, and in the country, garbage is often fed to swine, composted or buried on the premises, or mixed with ashes and other refuse and carted off at intervals at the owner's expense. The next step is for the neighboring farmers who wish to use garbage to feed to swine to call along certain routes with more or less regularity to remove the garbage which is kept separate for them by the householder. Such methods are now rarely if ever employed in cities of 25,000, though they are in Peoria and Poughkeepsie, and very many cities much smaller have better and more systematic methods. The next step is for the city, usually through the agency of the board of health, to attempt to control the collection of garbage by licensing and regulating the scavengers. Indeed a survival of this method is found in nearly all cities, for almost every municipality finds it necessary to permit private scavengers to collect garbage from hotels and restaurants, and often from private houses, and sometimes, as has been shown, this method of disposal is forced on the hotels and markets by the municipality. In most of the cities named on page 690, note 2, the garbage is collected in this way. Other cities which maintain a good municipal collection yet collect a considerable quantity in this way. Thus in Lowell and Fort Wayne about half the garbage is so collected. In Denver from thirty to sixty scavengers collect without charge nearly all the garbage except the poorest, but this city in 1899 was put to the expense of $1,600 in looking after their omissions.

Nearly all these cities forbid the removal of garbage, except by licensed scavengers. The licenses are usually granted by the health department, but sometimes when the municipal collection is made by another department, that department may also control the licensing. This is the case in Hartford where the street department collects the garbage and the ashes. In Grand Rapids, Mich., and Erie, Pa., the license is issued by the mayor. The regulations governing the garbage wagons usually apply to both municipal and private wagons, and have been fully considered. Usually a written application has to be made stating the name of the owner, the kind and size of vehicle, the places from which the garbage is taken, and its disposal. The form of application used in Philadelphia requires the applicant to state that the garbage will be moved in accordance to the rules of the board of health, and he must also state where the garbage is to be taken and for what it is to be used.[1] In that city no licenses are granted if the garbage is to be fed to hogs, and this requirement is practically prohibitive. In Salt Lake City persons who remove the garbage from their own premises are not required to take out a license.

[1] Philadelphia, Report of Board of Health (1895), p. 115.

Another step is to require the licensed scavengers to collect all the garbage in their districts or in the city, and to require the householder to deliver the garbage in suitable receptacles to the licensee, the householder paying for the collection. This is the plan followed in Cleveland (until 1898), Erie, Grand Rapids,[1] Oakland, Cal., and Portland, Ore.; in such cases the charge to be made is usually fixed by the ordinance.

In Chicago in 1899 a new ordinance was adopted governing private collectors of garbage, manure, ashes and all other kinds of wastes.[2] All wagons must be inspected monthly by the health officials, and on each inspection they are furnished with a tin sign, the signs being of different colors on alternate months.

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[1] The Grand Rapids ordinance has been tested in the Supreme Court and its validity affirmed. Report of Board of Health (1899–1900).

[2] RULES AND REGULATIONS GOVERNING THE GATHERING, REMOVAL, AND DISPOSAL OF GARBAGE, MANURE, AND OTHER REFUSE BY PRIVATE SCAVENGERS.

"Rule 1. (a) The box or body of every wagon or other conveyance used for the private scavenging of offal, table refuse and other matter usually known as garbage, or swill and other animal and vegetable refuse and wastes, including decaying animal matter and fish, shall be absolutely water-tight and provided with close-fitting covers, which shall be kept closed except when loading, unloading or cleansing. The outside of the box or body is to be painted white, and on each side shall appear in black letters, not less than four (4) inches high, the name of the Licensee and the number of the wagon, thus:

JOHN SMITH
LICENSED
No. 1.

"If more than one wagon is employed by a Lincesee, his wagons shall be numbered consecutively No. 1, No. 2, etc.

"Rule 2. (a) Drivers and collectors must perform their work expeditiously, without loitering or delay, and shall not allow any garbage (solid or liquid), or other refuse to fall upon the sidewalk, gutter, street or other surface without at once removing and cleaning up the same. Under no circumstances shall they empty the contents of garbage cans or other receptacles on the ground, or elsewhere than into the wagon box direct.

"(b) No driver shall allow his wagon to be so fully loaded, or to be in such bad condition or repair, or of such faulty construction, or to be so improperly driven or managed that any portion of its offensive contents, solid or liquid, shall fall upon or in any place, street or premises; and it shall be his duty, in such event, to replace at once on his wagon and to remove what has so fallen.

"(c) Garbage wagons must be cleansed and disinfected at the place of disposal and before being returned to service. They must at all times, when not in use, be kept in a cleanly, inoffensive condition; repainted from time to time, and the owner's name and the wagon number be always legible and distinct.

"(d) The boxes or bodies of wagons for hauling manure or dry wastes and refuse must be sufficiently tight to prevent any leakage or filtering of dust, etc., and their loads must be securely covered with canvas sheets or tarpaulins. No portion of the contents of such wagons must be allowed to escape into the air or to litter the street.

Often no fee is charged for a garbage license, and in other cases it is nominal, as twenty-five or fifty cents. In Spokane it is $2. But in those cities where the licensee has an exclusive privilege and makes an authorized charge upon the householder for collection a larger fee is sometimes imposed. Thus in Elmira, N. Y., it is $40 annually, in Erie, Pa., $100; and in Portland, Ore., $12. Most licenses are granted for one year, but in Spokane the time is three months.

In cities where collection is by private scavengers, it is made compulsory upon the householder, not only to provide a receptacle and place the garbage in it, but to deliver it to the scavenger. In Cleveland[1] the householder was (before municipal collection was adopted) fined $5 for every day during which garbage was allowed to remain on the premises after the scavenger had called. In Erie the householder is fined if garbage remains on the premises more than four days in the summer and one week in the winter, but the scavenger is not required to move it if the householder is more than one month in arrears in his payment. These regulations have not as yet (1899) been thoroughly enforced in either Erie or Grand Rapids. In fact one reason why the collection is unsatisfactory, when conducted in this manner, is that it almost impossible to overcome the ingenuity and persistence of the householder in avoiding the payment of the necessary fees. Thus in Montclair, N. J., where great effort was made to secure the thorough removal of garbage in this manner, it was reported that only thirty-five per cent. was regularly collected.[2]

The maximum price fixed for the removal of garbage by private scavengers is in:

Grand Rapids: 10 cents per week for private families and $1 for hotels, restaurants, and boarding houses.

The name of the Licensee and the number of the wagon must be displayed as in the case of garbage wagons.

"Rule 3. As soon as a wagon is loaded it must be driven at once to the specified place of disposal and on no account be allowed to stand in the vicinity of human habitations, school houses, etc. All collections must be disposed of within twelve (12) hours after being collected.

"Rule 4. Collections of garbage, manure and other refuse must be disposed of only at the place or places specified in the application for license. This specification is a prime condition of the approval of the license, and disposal elsewhere, without express authority of the Commissioner of Health, will result in prompt revocation of the license.

"Rule 5. All private scavenging of garbage and other material defined in Rule 1 must be done between seven (7) o'clock P. M. and seven (7) o'clock A, M. during the months of May, June, July, August, September, and October, and between six (6) o'clock P. M. and eight (8) o'clock A. M. during the remaining months of the year."

[1] Cleveland, Ordinances (1892), Chapter 30, Sec. 496.

[2] New Jersey, Report of State Board of Health (1896), p. 84.

Erie: Hotels or restaurants, daily or bi-weekly, $1.50 per month.
Families, 3 collections a week, 75 cents per month.
" 2 " " 50 " " "
" 2 " " April-October and 1 collection per week November-March, 25 cents per month.
Elmira: 10 cents per cubic foot for first 100 feet and 8 cents afterwards.
Omaha: Each barrel of 30 gallons or over, 20 cents.
Receptacles of less than 30 gallons, for each 10 gallons 10 cents.
Oakland, Cal.: Private families, 25 cents per month.
Portland, Ore.: Private families, 25 to 50 cents per week.
Montclair, N. J.: 15 cents a can, or $12 per annum per house.
Superior, Wis.: 50 cents per house per month.

It can be readily seen that if garbage is removed from every house at the above prices, and even at the lowest price given, it would amount to several times more than the most expensive municipal collection. Even if the garbage is half collected, private scavengers furnish the most expensive means of getting rid of garbage. It would seem that this alone ought to compel every city to provide for municipal removal; but it must be remembered that payments for garbage removal must be made from the tax levy, and a councilman who votes to raise the tax rate, meets with no favor at the hands of constituents, even if by so doing he has diminished their living expenses; but outside of any pecuniary advantage in municipal collection, its sanitary value requires its adoption. Health officers are agreed that it is only by municipal collection, that a good service from a sanitary standpoint can be secured.

As regards the choice between collection by contract and by city employees the correct decision is not so evident. There are general economic and social considerations in regard to the letting out of municipal work which it is not intended to discuss here, but which are of great importance and which should have perhaps the greatest weight in deciding the question. As a matter of fact, good results are obtained by both contract and municipal collection.

Contract work is sometimes not as satisfactory as that done by city employees, for many health officers have expressed a wish that their cities would employ municipal labor instead of contract, but the writer knows of no instance in which a contrary preference has been expressed.

The writer has attempted to collect data in regard to the amount and cost of collecting garbage, ashes, and rubbish, but it has been found a very difficult task. In most cities these waste materials are not weighed and the amount in tons or cubic yards must be estimated from the number of loads, and as these are not always of the same size the estimate may not be a very close one. In many cities no account is kept of even the number of loads, so that in such cases the estimate is still more unreliable. It is important to know the cost of disposal as distinguished

from the cost of collection but often they can not be separated. Again, the cost of collecting garbage and ashes is lumped with street cleaning or other sanitary work. A few of the figures in the tables here given are taken from the September *Bulletin* (1900) of the U. S. Commissioner of Labor, but most of the data have been obtained by correspondence or from official reports.

TABLE SHOWING THE AMOUNT OF GARBAGE COLLECTED AND COST OF COLLECTION IN A NUMBER OF AMERICAN CITIES.

City.	Population, Census of 1900.	Year to which data refer.	Amount Collected.	Cost of Collection.
Allegheny	129,896	1900	.....	$28,000 00
Asbury Park	4,148[8]	1900	3,772 cu. yds.	2,600 00[1]
Atlanta	89,872	1899	31,200 tons[10]	.....
Augusta, Ga	39,441	1899	15,603 loads[10]	4,500 00
Atlantic City	27,838[9]	1900	11,463 tons	9,900 00[7]
Baltimore	508,957	1900	49,000 tons	65,504 44
Birmingham, Ala	38,415	1899	.....	9,600 00
Boston	560,892	1899	60,000 tons	112,641 09
Bridgeport	70,996	1899	6,000 tons	per ton 2 73
Brockton	40,063	1899	4,500 tons	6,958 41[4]
Brookline	19,935	1899	.....	4,800 00[1]
Borough of Brooklyn	1,166,582	1898	102,000 tons	120,000 00[1]
Buffalo	352,219	1900	22,881 tons	33,000 00[1]
Cambridge	91,886	1899	6,794 tons	25,952 65[4]
Camden	75,935	1900	2,000 tons	1,200 00
Chelsea	34,072	1899	1,800 tons	3,800 00[1]
Cincinnati	325,902	1899	11,752 tons	24,583 00
Cleveland	381,768	1899	22,375 tons	69,400 00[1]
Columbus	125,560	1899	7,794 tons	15,800 00[1]
Dayton	85,333	1899	7,133 tons	16,674 00
Dallas	42,638	1900	9,000 cu. yds.[10]	.....
Denver	133,859	1899	12,000 cu. yds.	1,600 00[5]
Detroit	285,704	1898	14,732 tons	50,000 00[1]
District of Columbia	278,718	1899	20,946 tons	57,000 00[1]
Evansville	59,007	1899	5,000 tons	4,295 00
Fall River	104,863	1900	.....	11,400 00[1]
Fitchburg	31,531	1899	.....	2,600 00[1]
Fort Wayne	45,115	1898	5,421 tons[10]	3,349 60
Galveston	37,789	1899	14,887 tons[10]	18,933 00[1]
Hartford	79,850	1899	13,500 tons	9,850 00[1]
Haverhill	37,175	1899	3,000 tons	2,725 00[1]
Holyoke	45,712	1899	.....	1,056 00[1]
Houston	44,633	1899	27,000 tons[10]	16,697 83
Indianapolis	169,164	1899	17,454 tons	30,000 00[1]
Joliet, Ill	29,353	1899	3,500 tons	3,222 00
Kansas City, Mo	163,752	1899	15,000 tons	17,798 00
Lawrence	62,559	1899	4,463 tons	6,500 00[4]
Lowell	94,969	1899	4,035 tons	7,193 30[5]
Los Angeles	102,479	1899	.....	12,767 00[1]
Lynn	68,513	1899	5,859 tons	12,836 38[4]
Macon	23,272	1899	7,000 cu. yds.[10]	5,000 00
Malden, Mass	33,664	1899	7,695 cu. yds.	5,596 50[4]
Manchester	56,987	1899	.....	2,500 00[1]
Milwaukee	285,315	1899	28,716 tons	61,883 21
Minneapolis	202,718	1899	.....	17,000 00[1]

City.	Population, Census of 1900.	Year to which data refer.	Amount Collected.	Cost of Collection.
Montclair, N. J	13,962	1899	1,573 cu. yds.	$4,000 00[1]
Muncie, Ind	20,942	1899	3,705 tons	1,754 10
New Bedford	62,442	1899	.....	15,000 00[1]
New Haven	108,027	1899	.....	5,500 00[1]
Newport	22,034	1900	17,000 cu. yds.	4,980 00
New Orleans	287,104	1900	67,500 tons[10]	97,200 00[1]
Newton	33,587	1899	.....	5,700 00[1]
New York, Borough of Manhattan	1,850,093	1898	152,000 tons[10]	per ton 0 67
Norfolk	42,624	1899	5,719 tons[10]	.....
Paterson	105,171	1899	4,443 tons	.....[2]
Pawtucket	39,231	1899	.....	4,000 00[1]
Philadelphia	1,293,697	1899	199,357 tons	398,000 00[1]
Pittsburgh	321,616	1899	25,000 tons	92,000 00[1]
Providence	175,597	1899	16,000 tons	25,200 00[1]
Portland, Me	50,145	1899	.....	4,500 00[1]
Reading	78,961	1899	4,146 tons	per ton 1 35
Richmond	85,050	1899	4,810 tons[10]	10,460 00
Richmond, Ind	18,226	1899	3,935 tons	2,340 00
St. Louis	575,238	1899	69,634 tons	99,673 00
St. Paul	163,632	1899	.....	15,533 00[1]
Salem	35,956	1899	3,651 tons	8,000 00[4]
Salt Lake City	53,531	1900	11,546 cu. yds[10]	8,755 75
San Antonio	53,321	1899	8,000 loads[10]	10,000 00
Somerville	61,643	1899	11,274 tons	11,456 00[4]
Springfield, Mass	62,059	1899	4,858 tons	12,000 00[1]
Syracuse	108,374	1899	8,187 loads[6]	20,401 75
Taunton	31,036	1899	.....	1,484 87[4]
Terre Haute	36,673	1899	4,000 tons	2,800 00
Toledo	131,822	1899	7,204 cu. yds.	12,000 00[1]
Trenton	73,307	1899	.....	6,000 00[1]
Utica	56,383	1899	.....	5,700 00[1]
Wheeling	38,878	1899	7,450 tons	5,500 00
Wilmington	76,508	1899	9,390 tons	12,000 00
Worcester	118,421	1899	9,360 tons	17,109 00[4]
Yonkers	47,931	1899	6,260 tons	.....[3]

[1] Cost of collection and disposal.

[2] Cost of collection and disposal of ashes and garbage, $27,500.

[3] Cost of collection of ashes and garbage, $22,500.

[4] Cost is lessened by sale of garbage or garbage fed pork.

[5] Only a part is collected by the city. The rest is collected by ranchmen at no cost to the city.

[6] A load consists of ten barrels.

[7] The city owns the wagons.

[8] Resident population. The summer population is probably over 30,000.

[9] Resident population. In summer the population is said to exceed 200,000 at times.

[10] The garbage has a considerable amount of dry refuse mingled with it.

[11] Approximately.

Disposal of Garbage.

The problem of garbage disposal has not yet been solved. Although the theoretical value of the garbage is considerable, in practice it has never been found possible to get rid of it without some expense and usually not without some nuisance. Probably every form of garbage disposal has been tried in the United States, and has found its advocates, but the variance in method is in itself a demonstration that none of the methods are entirely successful.

It is possible in the country to dispose of garbage on the premises where it is made either by burying it, feeding it to animals, or burning it in a stove. In cities the latter is the only possible method of private disposal. It is sometimes adopted by neat people who do not wish to have a garbage pail about; but such people forget that to put garbage on a kitchen fire, however carefully, usually gives rise to some disagreeable odor which may be perceived by the neighbors. A device was put upon the market a few years ago which overcomes this difficulty by drying the garbage before it is put on the fire. The following is a description and cut of this "carbonizer":

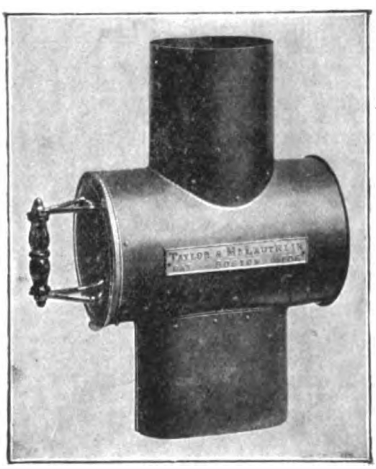

FIG. 83.
Garbage Carbonizer closed (as in use).

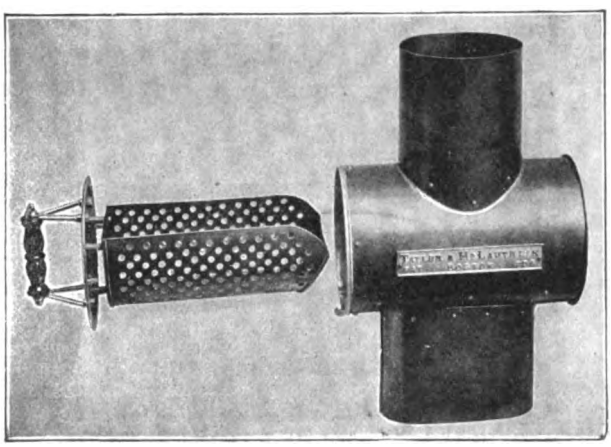

FIG. 84.
Garbage Carbonizer open.

"Between the stove, or range, and the flue of the chimney is placed a horizontal cylinder about one-third larger in diameter than the stovepipe, and in length about twice the diameter of the pipe. One end of this cylinder is removable, and attached to the inside of this end is a basket, or scoop, made with perforated sides and a tight bottom and somewhat smaller in diameter than the cylinder, giving a free passage for the smoke and heat, from the stove, around it and through the perforations. When it is to be used the basket or scoop is withdrawn by means of a handle on the outside of the cylinder head, filled with garbage and replaced in the cylinder. The

heat from the fire drives off the water and transforms the residuum into charcoal and this is put into the fire, burning with a clear flame, or after being left over night may be used to kindle the morning fire, since, with a piece of paper or a stick of kindling to start it, this carbonized garbage will ignite coal."

This apparatus is made by the Sanitary Construction Company, 30 State Street, New York. It sells for $5. It has given satisfaction in many families, as reported by the boards of health of Boston and Brookline, Mass., but has never come into very general use.

Dumping. The simplest and most primitive method of disposal is to deposit the garbage on some dump, using it to fill up low lands. This is only slightly better than allowing it to remain and decay in the back yard. This method of disposal is more common when garbage is collected together with ashes than when it is collected separately, which alone is now under consideration. This method of disposal is less offensive when the garbage is mixed than when it is separate, but none of the cities which adopt it are satisfied with it, and the writer never knew or heard of such a dump which was not bitterly complained of by all who dwelt or worked in its vicinity. It is forbidden by the rules of the state board of health of Florida.

According to Mr. Hering's report, the cities named below collect their garbage separately and dispose of it by dumping in waste places.[1] Sometimes an appreciable expense attaches to this method, for an available dumping ground may only be secured after a very long haul and sometimes it is necessary to hire land for the purpose, and usually it is necessary to station men on the dumps to level off and cover material deposited. In Baltimore in 1897 the expenses were $2,370.81. It is seen that the cities employing this method of disposal are few in number and mostly of small size, and the report from nearly every one indicates that the method is far from satisfactory. In most of them the garbage is supposed to be buried in pits, or covered with a thick layer of earth or ashes, but judging from the complaints made, this is frequently neglected. The dump question will be further considered in connection with the disposal of mixed refuse.

Plowing In. A much more scientific treatment of garbage is by plowing it into the soil and making use of its fertilizing qualities for the growth of crops.[2] Garbage was formerly used as a fertilizer by

[1] Adrian, Mich., Auburn, N. Y., Battle Creek, Mich., Bay City, Mich., Elmira, Hartford, Muncie, Meadville, Pa., New Brunswick, N. J., Newburgh, Oshkosh (in part), Poughkeepsie (in part), Pueblo (in part), Williamsport, Pa., Albany (in part), Baltimore (in part), Holyoke (in part), Wheeling (in part).

[2] This is done in Manchester, N. H., Baltimore (in part), Minneapolis (in part), New London (in part), Auburn (in part), Battle Creek (in part), Omaha (in part), Pawtucket (in part), Providence (in part), Fall River (in part), Springfield, Mass.

plowing in at Asbury Park, New Bedford, Newport, and doubtless many other places, but the plan was abandoned on account of the nuisance produced. In Baltimore, in 1900, it cost $9,950 to tow the garbage in scows to points where it could be used as a fertilizer.

Dumping in Water. The dumping of garbage in streams, lakes, or the ocean is in some respects even worse than its deposit on land. A city which deposits its garbage on land usually annoys its own citizens merely, but a city which deposits it in a river often injures other communities as well as itself. It rarely, if ever, fails to create some nuisance, and is without exception unsatisfactory to others, if not to the city committing the offence.[1]

With the exception of Newport, New Orleans, Boston, and Lynn, where it is towed out to sea, the cost of disposal by this method adds nothing to the cost of collection. In Boston and Lynn the amount so disposed of is mixed with other refuse. In Cleveland the garbage was taken ten miles out into Lake Erie, and some of it floated back to shore. The annual cost was $1,600. The cost of towing to sea in Boston is fifteen cents per load. In Newport the cost of disposal is $2,534 per annum.

Feeding to Animals. Another ancient method of garbage disposal is by feeding to animals, chiefly swine. Formerly it is said that considerable garbage was fed to cows, but at present it is rarely attempted. Colorado, Massachusetts, and New Jersey have statutes forbidding the feeding of garbage to milch cows, and so do a considerable number of cities, as the City of New York, Rochester, the District of Columbia, and many other states and cities practically forbid it by forbidding the sale of milk from garbage-fed cows, see p. 370. That garbage-fed cows give poor milk, often offensive to the taste, and that they are poorly nourished is generally admitted, and the practice was condemned in nearly every answer to the committee's inquiry; but in Peoria, Lynn, and Salem the health officials reported that no evil effects could be seen from such use of garbage. A former contractor in Providence was accustomed to feed garbage to cattle, sheep, and swine, and claimed that that was the most economical method, as the different kinds of animals ate different portions of the garbage most suitable for them,

(in part), Toledo, Utica, St. Paul (in part), New Haven (in part), Montclair, N. J., Rochester (largely). In Milwaukee it was formerly plowed in, but is now buried in trenches two feet wide.

[1] The following cities dispose of it in this manner: Cleveland until 1898 (Lake Erie), Davenport (Mississippi River), Dubuque, Kansas City (Missouri River), Nashville (Cumberland River), New Orleans (Mississippi River), Newport (Atlantic Ocean), Quincy (in part), Boston (in part into ocean), Lynn (in part into ocean). In Dubuque it is dumped from a platform into the Mississippi River.

and therefore thrived better and consumed the garbage more completely; but he admitted that garbage was not a wholesome food for cattle.

In a few cities, as Cambridge and Denver, and probably to a slight extent in many other cities, garbage is used as a food for poultry; but it is for feeding swine that garbage is chiefly employed. There can be little question that this is the most economical method of utilizing garbage yet devised, and is the cheapest way in which it can be disposed of. The larger the city the more difficult it is to make use of it, but that it is a very popular method of disposal is shown by the fact that it is employed in the cities named below.[1]

It is generally stated that the feeding of swine upon garbage exclusively produces an inferior quality of pork, but the managers of the poor farm at Worcester where all the city garbage is fed to swine and is their exclusive food, state that they receive more for their pork than western pork brings in the same market. It is also said that it induces hog cholera, but there does not seem to be any evidence that this is so. The longer the garbage is kept before it is fed the further it has undergone putrefaction and the worse it is said to be for the swine; but if the animals are fed on garbage which is reasonably fresh, and especially if garbage is not the sole food, and corn is used for the final fattening, very good pork can be obtained. Another objection to the feeding of garbage to swine is that garbage-fed swine are more liable to trichinosis than are swine fed on other food. According to the investigations of the Massachusetts state board of health garbage-fed hogs are afflicted with trichinosis to the extent of thirteen per cent., which is a very much larger percentage than is found in western hogs.[2] This is not, however, so serious a matter as would at first appear, for this disease is transmitted to man almost exclusively through eating raw ham, and as a matter of fact it is rare as a human disease. If the small minority who indulge in raw pork would give up the practice there would be no cases in the human subject. By thus attempting to minimize the evil of the disposal of garbage by feeding to swine the writer does not intend to maintain that it is a desirable method, but would simply venture the opinion that under certain conditions it is not a very bad method; and unfortunately, no method as yet devised is entirely satisfactory. The

[1] Adrian (in part), Albany, Asbury Park, Battle Creek, Bay City, Boston (in part), Brockton, Cambridge, Chelsea, Denver, Erie (in part), Fall River, Fitchburg, Haverhill, Holyoke (in part), Jackson, Mich., Lawrence, Lowell, Lynn, Malden, Minneapolis (in part), Newburgh (in part), New Haven, New London, Newton, Omaha, Pawtucket, Portland, Me., Poughkeepsie, Providence (mostly), Pueblo (in part), Quincy (in part), Rochester (in part), Rockford, Salem, San Jose, Sioux City, Somerville, Springfield, Mass.. Springfield, O., St. Paul (in part), Taunton, and Worcester.

[2] Massachusetts, State Board of Health Report (1889), p. 113.

feeding of garbage to swine is the only method as yet by which a city can receive some return for the outlay for collection and disposal. Sometimes the garbage is sold to farmers, thus bringing a direct money return, as is shown below.[1]

In Rochester, Taunton, and Worcester the garbage is not sold, but is fed to swine on the poor farm. In Brockton in 1899 the collection of garbage cost $6,779.43, and the amount received from the sale of swine was $4,258.41. In Worcester in the same year the cost of collection was $17,109 and the amount received for pork was $10,641.52. In the cities just mentioned a direct income is received from the disposal of garbage, but there are a number of other cities in which the cost of collection and disposal is materially lessened by feeding it to swine. The contractor is enabled to name a low figure because he derives some return from his swine. In Boston the cost of collection is $0.20 per capita, in Cambridge $0.27, in Brockton $0.17, in Lynn $0.18, in Lawrence $0.10, in Somerville, $0.17, in Worcester, $0.14. In all of them the collection is made by the city. In the following cities contracts are let at lower prices because the contractor makes profit from his swine: In Fitchburg the contract is $2,600, or $0.08 per capita. In Haverhill it is about $0.07, in Portland, Me., $0.09, in Holyoke $0.02. These are very low figures for New England. In New Haven the contract for 1899 was $5,500, or $0.05 per capita, while in Hartford, where most of the garbage is worse than wasted on dumps, the cost of collection in 1896, the last year for which figures were obtained, was about $0.11. In Denver there are six contractors who collect each in his own district. They do the work for nothing, getting their compensation from the swine which they feed. Certain portions of the city could not be let out in this way, and the cost of collection in these districts was $1,600 in 1899.

Reduction Processes. The value of the materials contained in garbage is so considerable that during the past ten years an immense amount of labor and large sums of money have been spent to find some way to utilize it other than by feeding to swine. The valuable ingredients which can be obtained from garbage, besides such extraneous and

[1] Boston received for the sale of garbage in 1898, $10,982.25.
Cambridge received for the sale of garbage in 1899, $6,997.40.
Lawrence received for the sale of garbage in 1897, $796.23.
Lowell received for the sale of garbage in 1899, $3,547.
Lynn received for the sale of garbage in 1899, $2,714.60.
Malden received for the sale of garbage in 1899, $900.
Salem received for the sale of garbage in 1899, $900.
Somerville received for the sale of garbage in 1899, $800.
Springfield, Mass. received for the sale of garbage in 1900, $1,244.05.

accidental materials as junk, rags, lost articles, etc., are the grease and the fertilizing ingredients, nitrogen, phosphoric acid and potash. The value of the garbage, as it depends upon these substances, varies in different seasons, and in different cities and in different sections of the same city. The poorer the people, the poorer the garbage, for the grease and nitrogenous matters are more completely used as food. Summer garbage is not as valuable as that gathered at other seasons, chiefly on account of the waste vegetable matter as corn husks and melon rinds, and partly also doubtless because less meat is consumed at that season. In northern cities winter garbage is less valuable than that of the autumn and spring, because it usually is mixed with more or less ice and snow. The variation in garbage analyses, and also in garbage statistics, is due many times to the varying amounts of water contained in it. If water-tight receptacles are insisted on, garbage will contain more water than when it is kept in leaky boxes. If the receptacles are kept covered there will be less water than otherwise, on account of the exclusion of rain and snow. If garbage is weighed as collected in the cart it will contain a higher proportion of water than if allowed to drain after dumping on to a floor or railway car. Also the weight and value of garbage will vary according to the strictness of separation from other wastes. The average composition of 3,000 tons of summer garbage from Buffalo, St. Louis, Philadelphia, and Brooklyn, N. Y., treated under the direction of George E. Waring, Jr.,[1] was as follows:

Average Composition of One Ton of Garbage:

Rubbish, 140 lbs	7	Per Cent.
Water, 1420 lbs	71	"
Grease, 40 lbs	2	"
Tankage, 400 lbs. (Containing Ammonia, 13 lbs., Phosphoric Acid, 13 lbs., Potash 3 lbs.)	20	"

It is not clear from the report whether the garbage was allowed to drain before the analysis, but probably it was. Garbage in most of the New England cities is rather more valuable than that treated by Mr. Waring. It also has rather less rubbish and more water.

In Providence the composition of the garbage treated by the Simonin process was:

Tankage	20	per cent.
Grease	4–5	"
Ammonia	3.5	"
Bone phosphate	12	"
Potash	1	"

[1] Report on the Final Disposition of the Waste of New York, George E. Waring, Commissioner of Street Cleaning, New York, 1896.

The analysis of the Merz output in Buffalo for several months was:

Grease	3.59	per cent.
Ammonia	3.70	"
Phosphoric Acid	3.93	"

An analysis of the Philadelphia tankage as made from garbage by the Arnold process is given by Mr. Hering as:

Moisture	4.80	per cent.
Phosphoric Acid	2.69	"
Ammonia	3.06	"
Potash	.66	"

The analysis in Pittsburgh was:

Ammonia	3	per cent.
Phosphoric Acid	3	"
Potash	1.5	"

According to Waring's estimates, which are not high, garbage would be worth, if its ingredients could be utilized, $2.47 a ton.

The amount of garbage collected per day varies very greatly according to the care with which it is separated by the householder and gathered by the city. The following are the estimates of the amount of garbage collected per capita annually:

City.	Pounds of Garbage Collected per capita per annum.	City.	Pounds of Garbage Collected per capita per annum.
Boston	247	New York	147
Buffalo	137	Paterson	80
Cambridge	150	Philadelphia	321
Detroit	84	Salem	202
Indianapolis	174	Somerville	375
Lowell	100	St. Louis	223
Lynn	166	Worcester	178
Milwaukee	205	Average	199

If the above average be correct, millions of tons must be collected annually from our large cities worth double that number of millions of dollars. It is not to be wondered that energetic efforts have been made to save this waste.

Merz Process.

This was the first successful reduction process for the treatment of garbage, that is, it was the first that was applied for any length of time to the treatment of all the garbage of a city of considerable size. Many attempts at reduction had previously been made, sometimes on a considerable scale, as those of the Whites at Barren Island at about 1870; but none of these attempts were entirely successful even from a mechanical standpoint. The Merz process was introduced into Buffalo in

1888, and is still in operation there. It is also employed in St. Louis, and a modification of it in Pittsburgh. The garbage, when received at the works, is dumped into a large steel hopper grated below, from which the superfluous water can drain off into the sewer. From the receiving tanks the garbage is drawn up as wanted onto the second floor, and as much of the foreign matter as possible, such as rags, bones, iron, cans, bottles, etc., is culled from it. The materials culled out are sold. The garbage is then dumped into the driers. The driers are jacketed cylinders with revolving shafts, with arms to stir the garbage during the process of drying. Each drier holds about three tons and the operation of drying consumes about six hours. When the material leaves the dryer it is pretty well triturated, is of a dark brown color, is quite greasy and has very little odor. It is then carried to the extractors, which are closed tanks with false bottoms. Here naphtha is allowed to percolate through it to extract the grease. The solution of grease is drawn off, the naphtha driven off, and the grease barreled for sale. Garbage grease, however obtained, always has a garbage odor and is not suited for soap making. Much of it is shipped abroad, and the market here is limited to a few customers, as it can be put to little use unless subjected to destructive distillation. Grease obtained by the Merz process is of a dark brownish or greenish color, as is indeed the grease obtained by all the reduction processes. The dry residue after the separation of the grease in the extractors is ground and sifted and sold to fertilizer manufacturers. The writer twice visited the works in Buffalo and found them quite offensive. The process may, however, be carried on in a much more sanitary manner, and is so in St. Louis. The following conditions were found in that city by Dr. William C. Woodward:[1]

"Gases arising in the course of this process are passed through condensers, and the non-condensible portions passed through the furnace.

"Throughout the entire establishment, wherever garbage or its products are exposed to the atmosphere, are large ventilating flues, into which all foul gases are drawn by means of fans. These gases are carried through the fires under the boilers and are there decomposed. A separate sewer has been laid directly into the river, it having been found impossible to use the public sewer without creating a nuisance. This, it is claimed, is not due to odors from the reduction plant, but to the hot water from that plant setting free foul gases from materials deposited in the sewers elsewhere.

"At the time of making inspection the factory was engaged in ordinary daily work. Outside of the building no odor could be detected. Inside, in places, it was quite foul. The sanitary condition, so far as the public is concerned, depends on the system of ventilation, and not on anything peculiar to the Merz process. All windows and doors, except a few on the side from which the wind blows, are kept closed."

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[1] District of Columbia, Report of Health Officer (1896), p. 240.

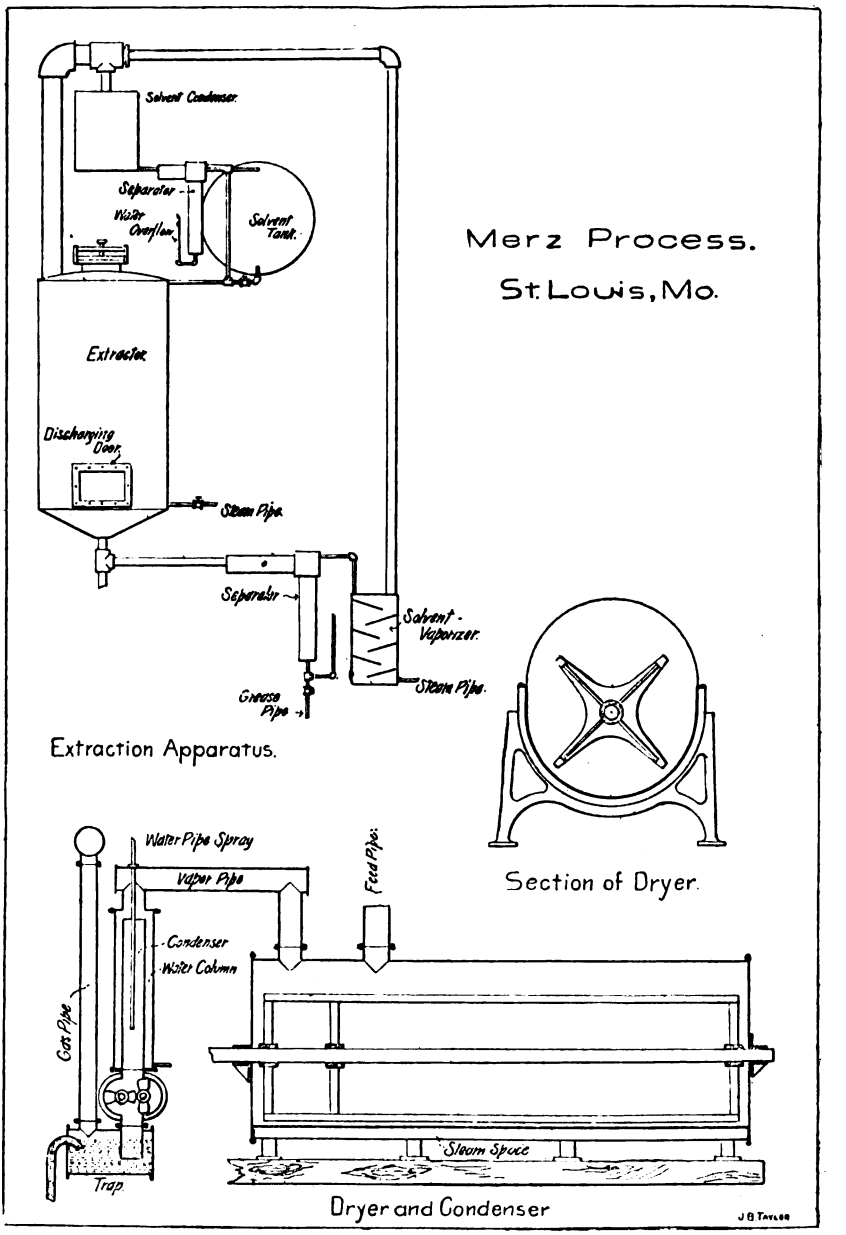


FIG. 85.

Diagram illustrating the construction of a Merz Reduction Plant. From the Report of the Health Department of Brooklyn, 1896.

The plant in St. Louis is said to have cost $280,000. The amount of garbage treated there in the year ending 31 March, 1897, was 66,341 tons. The contract price paid by the city for the reduction was $1.80 per ton up to 100 tons per day or $65,689.48 for that year. The per capita cost of disposal in St. Louis for that year was perhaps $0.12. In Buffalo the contract price for disposal is $15,840 per year. In 1900 22,881 tons of garbage were reduced, making the cost per ton $0.69 and per capita $0.045. Works were at one time in operation in Detroit and Milwaukee, but they have been abandoned.

In Pittsburgh the garbage is collected and disposed of by contract. The garbage is carried to works situated in the thickly built portion of the city. It is here partially dried in Hogel dryers and it is then loaded in box cars and carried out into the country where the grease is extracted by naphtha, somewhat on the plan of the Merz process. The works in Pittsburgh when visited by the writer were causing a good deal of offence, though the vapors from the dryers were burned under boiler fires; but little attention was paid to details and it is only by such attention that real cleanliness can be secured. The Pittsburgh contract for collection and disposal is for $92,000, or about $0.29 per capita. The amount collected could not be determined, so that the cost per ton could not be determined, nor could the cost of disposal be separated from the cost of collection.

Simonin Process.

The Simonin process, like the Merz process, extracts the grease from the garbage by the use of naphtha. It has this advantage over the Merz process, in that the garbage can be at once placed in the extractors without previous drying. This process was introduced in Providence in 1890 and was abandoned as it was not profitable, the owners receiving no bonus from the city. It was afterwards operated for a short time in New Orleans, but there was trouble between the contractors and the city in regard to the collection of garbage, so that after a short time the plant was abandoned. A plant was also started in Cincinnati soon after the one in Providence and has been in operation ever since. In 1898 the amount paid for garbage disposal by the Simonin process in that city was $25,000, and the amount of garbage about 15,000 tons, or $1.62 per ton. The reduction company, however, claims not to have found the business very profitable since the advance in the price of naphtha. The following cut and description of the process were prepared by the writer for a meeting of the American Public Health Association held in Mexico in 1892.[1]

[1] American Public Health Association, Reports and Papers, Vol. XVIII., p. 259, 1893.

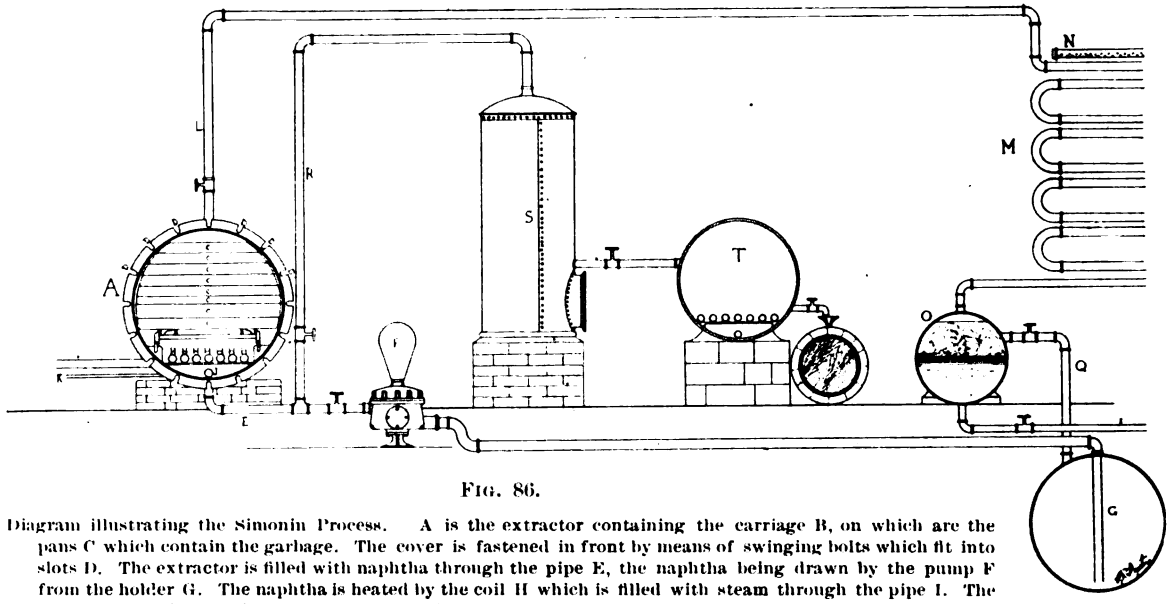


FIG. 86.

Diagram illustrating the Simonin Process. A is the extractor containing the carriage B, on which are the pans C which contain the garbage. The cover is fastened in front by means of swinging bolts which fit into slots D. The extractor is filled with naphtha through the pipe E, the naphtha being drawn by the pump F from the holder G. The naphtha is heated by the coil H which is filled with steam through the pipe I. The open-steaming is done through the perforated pipe J, which is filled with live steam through the pipe K. During the process of evaporation the naphtha and water vapor pass through the pipe L to the condenser M, which is cooled by water dropping from the pipe N. The condensed water naphtha vapor flows into the separator O from which the water passes to the sewer through the pipe P, and the naphtha to the reservoir through the pipe Q. The grease which is extracted from the garbage is forced through the pipe R to the settling tank S, from which it passes to the still T, in which it is finally separated from the remnants of naphtha which it contains and from which it is drawn into barrels for shipment. The still is provided with heating coils and open-steam pipes similar to those in the extractor.

The garbage is dumped on the floor and loaded onto perforated pans which are run into the extractors on cars. The extractor is closed and filled with naphtha which is rapidly evaporated by steam coils in the bottom. The hot naphtha vapor carries off the water and both water and naphtha are condensed and separated, the former flowing into the river and the latter being used again. The naphtha dissolves the grease, and as the evaporation is stopped before all the naphtha is driven off, a solution of grease in naphtha is left in the bottom of the extractor and is drawn off for complete separation in another still. This process is repeated several times till all the water is removed when the naphtha remaining in the garbage is driven off by live steam. The extractor is then opened and the dry garbage removed and ground and sifted. The extractors hold about eight tons and the process takes about forty-eight hours.

The writer, from considerable personal experience, believes that this process can be conducted with very little nuisance and with a moderate degree of profit, even without the payment of a bonus; but this can only be done in a city where the garbage is very carefully separated.

Arnold Process.

There are several processes in use for the disposal of garbage which consist in rendering it to recover the grease which it contains and drying the residue to be used as a fertilizer. One of these is known as the Arnold Process, operated by various local companies in which the same persons are interested.

This concern has contracts for the disposal of the garbage of Boston, New York (Manhattan and Brooklyn), and Philadelphia. The works are different in the different cities, for experiments are constantly being tried and improvements introduced. At the works in Boston, when visited by the writer, the garbage was brought from the dumping dock, a distance of about six miles by water, on a large deck scow. From this it was shovelled by six men into an elevator and conveyor which carried it to the upper floor of the building and discharged it into the digesters. These are upright cylinders, capable of holding eight tons. They are arranged in groups of four over a press. After they are filled with garbage they are closed, and the garbage treated with live steam. After the garbage is cooked a sufficient length of time the contents of the digesters are allowed to fall through a valve in the bottom into the press. This press is of novel design, and the pressing is a continuous operation, the tankage being passed between powerful rollers. These presses seemed to work well when seen, though they sometimes get out of order when heavy foreign substances get into them. From a sanitary standpoint they are far better than screw presses, for the hot material

need not be at all exposed to the air. If they can be kept in repair it would seem that they ought to be economical as they do not require as much labor as ordinary presses. From the presses which are arranged in a series beneath the digesters the tankage is carried by a common conveyor to the dryers, which in Boston are of the Anderson type. In Boston when the works were started the nitrogen was extracted from the tankage and sold in the form of ammonia, but at the time of the writer's visit the works had suffered from fire and the tankage without being dried was carried to sea. It is said that in other works operated under this company the tankage after drying is ground, screened and bagged and sold to fertilizer manufacturers. The grease and water which runs from the presses is pumped into a tank where the grease floats and is drawn off into barrels, and the water allowed to run into the bay. At Boston, and it is said in other cities, little attempt is made to prevent odors arising from the process. It would be possible to keep the entire process enclosed so as to keep in and condense and burn all gases, but it is evidently considered by the operators to be cheaper not to try to prevent nuisance, but to seek a location where the nuisance will affect very few persons; but certainly in New York, Brooklyn, and Boston they spend a considerable sum in transporting the garbage to their works. In Boston they own six scows costing $3,500 each, besides a towboat.

In Boston the contract is for ten years from 1898. The amount named is $47,500 per year and the contractors are to take care of all garbage delivered to them. At present (1899) from three-fourths to four-fifths of the total garbage is disposed of in this way and the remainder is sold to farmers. The amount of garbage collected in Boston in 1899 was about 60,000 tons, and of this about 45,000 tons were treated by the reduction company. The cost to the city for disposal must therefore have been about $1.00 a ton. In the borough of Manhattan a five year contract for the disposal of garbage expires 1 August, 1901. The amount received by the New York Sanitary Utilization Company under the contract is $89,990. As the amount disposed of in 1899 was 151,100 tons, the cost per ton was not quite $0.60. The garbage is delivered on board the company's scows at the city docks and the company tows them to the works at Barren Island in Jamaica Bay at its own expense. The borough of Brooklyn had a contract for the collection and disposol of garbage for $120,000 per annum. As only the contractors' estimates are given for the amount of garbage collected, it is impossible to determine how much it costs per ton, and likewise it is impossible to separate the cost of collection from that of disposal. It is said by the contractor that 102,000 tons were collected

in 1898. The per capita cost of collection and disposal in both Manhattan and Brooklyn is not far from $0.10. In Philadelphia also the contract is for collection and disposal so that it is not possible to separate the cost of the two. The contract is for $398,000. According to the statement of the director of the department of public works the amount collected in 1899 was 199,357 tons. According to this, the cost of collection and disposal was about $2.00 per ton. The per capita cost of collection and disposal was aboat $0.30, or three times what it is in Manhattan and Brooklyn, but not very much more than the cost for the same service in Boston.

Chamberlain Process.

The Merz process was at one time operated in Detroit, but does not appear to have been successful. Some of the persons interested in that undertaking afterwards adopted a rendering process which has since been employed in that city and has also been operated at Indianapolis and Cleveland. The writer has understood that the contractor who collects the garbage at Columbus, O., employs this process for its disposal, but has never been able to obtain definite information whether this is so or not, though a recent letter from the city clerk states that it is rendered in some way. Neither has the writer been able to obtain any description of the process, as he was not permitted to inspect the works which he visited at Cleveland. It is said that the garbage is rendered as in the Arnold process and the resulting tankage dried in rotary driers and made into a fertilizer, or sold to fertilizer manufacturers. At Cleveland apparently little attempt was made to prevent nuisance. The works were perhaps three miles out in the open country and the garbage was carried out on cars as explained on page 687. In Detroit also the works are twenty-five miles from the city, but in Indianapolis they are not far away, so that the garbage is drawn out in the wagons in which it is collected. In Indianapolis the disposal is contracted for separately from collection and the amount paid in 1899 according to the superintendent of the street department was $12,000. The amount collected according to the same authority was 17,454 tons, which would make the cost of disposal about $0.69 per ton. The amount paid for collection and disposal is $42,000, which would make the cost per ton about $2.40 and per capita $0.24. In Cleveland, Detroit and Columbus the contracts are for collection and disposal, so that it is impossible to separate the cost of the two. In Detroit, according to the engineer of the board of health, 14,732 tons were collected and disposed of at a cost of $50,000 or $3.40 per ton. This amount of garbage is small for a city the size of Detroit. The per capita cost of collection and disposal in 1899 when the contract price

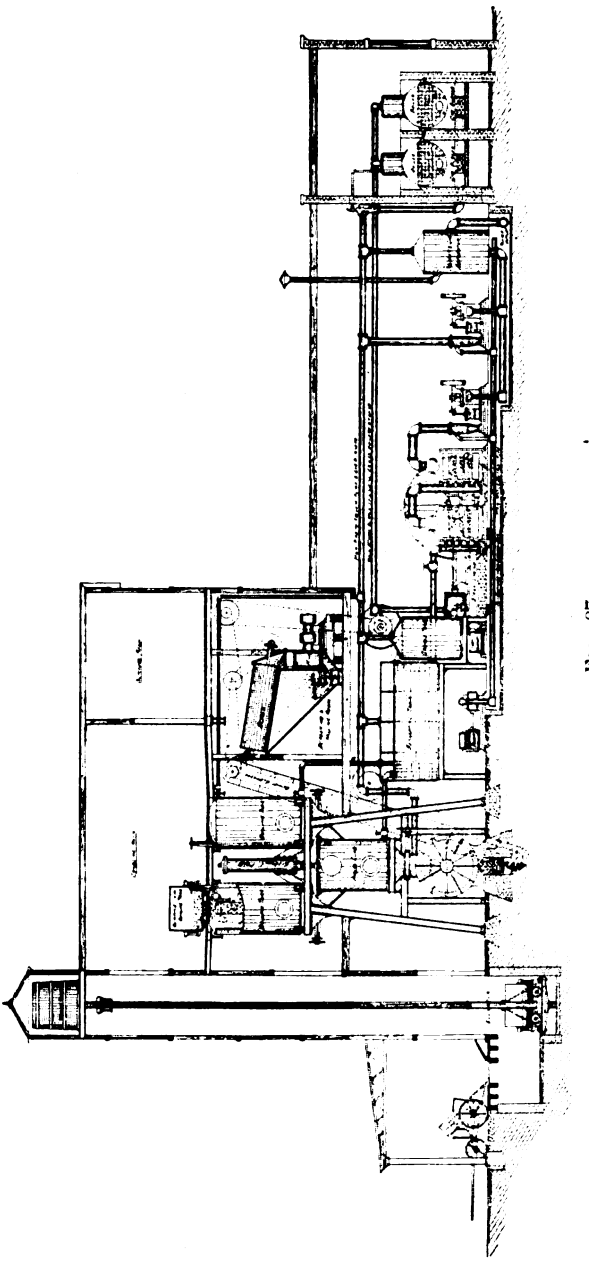


FIG. 87.

Diagram of the Holthaus System of Garbage Disposal, controlled by C. C. Currier, of Newark, N. J.

was [illegible] was [illegible]. In Cleveland the contract for collection and disposal is for [illegible]. It is stated that 22,375 tons were collected in 18[illegible] which would make the cost per ton $3.10. The per capita cost of collection and disposal is $[illegible]. In Columbus the contract for collection and disposal is for $15,[illegible] or nearly $0.12 per capita. In 18[illegible] the amount collected was 7,7[illegible]4 tons, making the cost $2.0[illegible] per ton. Holthaus System.

This system was first used for the treatment of municipal garbage at Bridgeport, Conn. The works were well constructed and from a sanitary standpoint the results were excellent. The project was however soon abandoned, apparently because it was a financial failure. The amount paid in that city was $0.34 a ton. The only plant now in operation is at Syracuse. The garbage in that city is collected in barrels and is dumped from them into a car standing on an elevator, which carries it to the top of the building. The car is rolled to the digester and its contents discharged into the latter. This digester when full is closed, and about twenty per cent. of water added, and the whole is digested with steam. The digesters are arranged in groups of four connecting by valves with a press below. When the digestion is complete the mass is allowed to fall into the press where the water and grease is pressed out and allowed to run into the separating tank from which the grease is drawn off into the grease tank and then into barrels. The tankage falls into a dryer and from this it is carried by a conveyor to a room where it is ground and screened. The whole process, from the time the garbage is put in the digesters till the dry tankage and the grease appear, is conducted in apparatus which is securely closed. Pipes lead from the different portions of the apparatus to a vacuum pump which draws all gases through a condenser and then passes them through the fire. All water vapor from the drying and rendering processes is condensed and all water is evaporated and then condensed so that all the liquid wastes from the works are free from offence. When visited by the writer the works and their vicinity were almost entirely free from odor. There is no reason why the works cannot be operated in this manner, for the apparatus is intelligently designed to keep all gases from escaping. The contract price for disposal in Syracuse is $26,000 per annum. It is said that about thirty-five or forty tons are collected daily. If the yearly total is 12,000 tons, which is perhaps not improbable for a city of 108,000, the cost for disposal would be $2.16 per ton. The per capita cost of disposal alone is $0.24. Baltimore has recently contracted to dispose of its garbage by this system but the matter has been taken to the courts. The contract is to collect and dispose of garbage and ashes for ten years at $148,000 per year, which is more than $20,000 less than the city now expends.

American Reduction Company's Process.

This process does not differ in principle from that of the Arnold and Holthaus systems being one of rendering and drying. An experimental plant of large capacity was some years ago constructed in Brooklyn and was seen in operation by the writer. The construction of this plant was far from satisfactory, but it is understood that subsequent plants were better built. One was in operation for a year or two in Philadelphia, and the following description is from a report by the board of health which was furnished the writer by the company and is doubtless correct:

"The garbage is brought there daily to the amount of, say about forty-five loads. It is immediately dumped on a space adjacent to the lift consisting of an endless chain supplied with buckets. The garbage is thrown upon these buckets and carried to an upper floor and fed to the digesters, of which there are six. These digesters are large steel cylinders supplied with steam-pipe and lids fitted with clamps, so as to make them steam-tight. When filled with garbage a certain proportion of sulphuric acid is added for the purpose of disintegrating the mass and fixing the volatile constituents, such as ammonia and the like, for the value in fertilizer. Live steam is admitted to these cylinders for about three hours. There is about three per cent. of oil secured, and this, at present, is skimmed from the surface and placed in open tanks until cooled, when it is barreled and shipped abroad.

"At the completion of the digesting process the material is transferred to dryers, three in number, located on a lower floor. These dryers are cylindrical, steel-jacketed tanks in which there are revolving arms for the purpose of agitating the mass and preventing charring. The steam is admitted into the jacket and the process occupies about ten hours, when the contents, deprived largely of its moisture, is sifted, ground and bagged for transportation.

"This product is a dark brown granulated substance, having the so-called caramel smell or smell characteristic of roasted vegetable fibre, and is not putrid, nor fœtid, nor pungent, nor markedly offensive.

"From the digesters, pipes are carried to condensers into which they are admitted near the bottom, so that the vapors and gases can be thoroughly washed by innumerable jets of water before they escape at the top. From the dryers pipes are also led to condensers for the same purpose. The exhaust pipes from the condensers carrying gases which have escaped condensation to a large iron retort, 15 x 13, where they are mixed with gases generated from burning gas coal.

"The gases from the condensers are combustible and when mixed in the retort the chemical combustion produces a colorific and combustible gas, which is fed to the furnaces and there burned, forming the sole source of heat for generating steam for the works. The five pits of the furnaces are so arranged that the gases must necessarily impinge upon a thoroughly heated and somewhat obstructing surface of brick, thus ensuring a more complete combustion. What escapes into the smoke stacks must necessarily be deprived of any deleterious or odorous quality. The water of condensation passes into the sewer. This water upon examination does not appear to be markedly offensive. It has been tested in the laboratory without producing any very significant results.

"An apparatus has been designed and constructed by which the skimming of oil can be dispensed with. This apparatus is a centrifugal machine, ingenious in design and satisfactory in its results. It consists of a bi-conical chamber, with outlets at the central plain by which the oil is whirled out into a covered circular trough. After the oil is extracted the remainder of the material is gotten rid of by the same

process, by simply raising the dome and collecting it, as expelled, into a proper receptacle. Were this centrifugal apparatus in use it would lessen greatly the manipulation and exposure of the material to the air during the process of manufacture."

The only city where this company is at present operating works is Reading. The contract price for disposal in that city is sixty-five cents per ton.

In Paterson the contractor disposes of the garbage which he collects by drying it in some sort of drying apparatus and disposing of the dry material to farmers, either giving it away or selling it for a nominal sum, as ten cents a ton. It is impossible to learn the cost of this treatment, as the contract in Paterson is for the collection and disposal of garbage and ashes, which are, however, collected separately. The amount of the contract is $27,500, and in 1898 4,443 tons were treated.

In New Bedford the contractor delivers the garbage to a company which renders it for the grease. The company receives no return except what it is able to obtain from the garbage. The works have not been long in operation.

In Utica the garbage is collected and disposed of by contract. The contractor is said to make a fertilizer of it, but the writer has not been able to learn anything of the process. He receives $5,700 for collection and disposal.

Cremation.

Cremation is exclusively employed for getting rid of garbage in England and on the continent of Europe, and is rapidly coming into use in the United States. The destruction by fire is theoretically an ideal way from a sanitary standpoint for the disposal of garbage. The products of combustion are inoffensive and sometimes have a slight value. The process ought to be so conducted as to create no nuisance, a condition, however, which cannot be obtained without great care. The chief drawback is the expense. There is little or no return and the outlay for repairs, labor and fuel is considerable.

Burning in the Open Air.

This is the most primitive method of cremation and is almost as unsanitary in its operation as dumping, but better in its results. This method is employed in Augusta, Galveston, and Macon, and a number of small cities in the South,[1] and to some extent in Minneapolis and Youngstown, O.

Augusta and Macon are the only cities which claim that this method is satisfactory. In the former city it has been in use for sixty years. In

[1] North Carolina. Report of State Board of Health, 1893–4, p. 182.

both cities there are few persons dwelling near the dumps. In Augusta the garbage and dry refuse are simply burned where dumped on the surface of the ground. One man tends the dumps and the fires. The ashes in Augusta are carted away to farms for a fertilizer. In Macon the garbage is burned in open pits on ordinary grate bars. Cotton waste and rosin dross are used for fuel. Six men are employed at $1.25 a day. The cost of disposal in Macon is $3,200 for about 7,000 cubic yards.

Engle Furnace.

One of the earliest and most popular furnaces in this country was the Engle; and it was brought to the attention of the public by its use to cremate the garbage of the World's Fair at Chicago. The following is from a paper by Col. Morse:[1]

"The Engle garbage cremator may be briefly described as a rectangular brick structure, forty feet long, ten feet wide, and twelve feet high. At one end a stack of iron or a brick chimney seventy-five feet high, over the furnace an iron covering house with sliding doors, and at the sides, a little above the top of the furnace, wide platforms with ample driveways and approaches. From the platforms iron slopes lead down to the feed-holes in the top of the furnace. These are five in number, one being large enough to receive the carcass of a horse. The collection carts dump their loads directly upon the slopes, no further handling being needed. The garbage, as it falls through the feed-holes, is caught by grate bars, extending across the interior half way from top to bottom. The liquid passes through these bars and is retained in a shallow concave pan or hearth below the bars.

"The furnace being charged, the fires are lighted first at the front and afterward at the rear end, the flames from this fire passing over and through the mass of garbage piled on the grates, driving the smoke and gases into and across the second or front fire, where they are consumed. The flames from the second fire are, by the action of the strong draught, brought back underneath the garbage grates, intensely heating the garbage from the under side. When liquids are to be destroyed, a part of this heat and flame is directed under the hearth or pan, and all the contents quickly evaporated and burned. All the odors, gases, and product of combustion are passed through one or the other of the fires, there being no escape except across these fire boxes. The ashes, as they fall through the grates, are raked out of a lower range of doors on the side, and from time to time, as required, the garbage is stirred up and distributed over the grates by bars thrust through an upper range of stoke doors."

This furnace, like other garbage works, has been built in a number of cities where it has been afterwards abandoned, but at present it is in operation in Des Moines, Evansville, Ind., Grand Rapids, Lowell, Norfolk, Portland, Ore., Richmond, Ind., Richmond, Va., Savannah and Salt Lake City.

Probably the most accurate data concerning the cost of cremation may be found in the reports of the board of health of Lowell. A cre-

[1] The methods of collection and the disposal of garbage by Cremation, read at the sanitary convention of boards of health at Erie, Pa., 28 April, 1892, by W. F. Morse.

matory was built in that city in 1892 at a cost of $7,615.90: the next year 3,500 tons of garbage were consumed at a cost of $7,670.77, or $2.19 per ton. The second year, 1894, when everything was in better running order, the amount burned was 3,486 tons at a cost of $5,742.59, or $1.64 per ton. In the largest week of that year 93 tons were burned at a cost of $1.05 per ton. The chief value of the Lowell data is that they are given in such detail week by week for several years. The items for fuel, labor, and repairs are clearly shown. Thus of the total expenses in 1894, viz., $5,742.59, $3,006.15 was for coal: $1,553.90 for labor; $158.05 for the lease, and the remainder for repairs. Coal cost $4.70 per ton. In 1895 2,750 tons were burned at a cost of $3,662.53, or $1.33 per ton. Apparently the reduction in cost of cremation was due largely to the increased disposal to farmers of a part of the garbage containing the most water and the least combustible material, and also to the fact that householders were encouraged to put paper and other combustible material in the garbage. Lowell has to pay more for fuel than the great majority of cities, and as the fuel item is considerably over half the total expenses, it can be seen that a reduction of one-half in that item, which many cities can easily make, would materially diminish the cost. The lack of funds to operate the crematory at the rate of expense above given, has resulted in shutting it down in the winter and selling more and more garbage to farmers, till in 1899 only 105 tons of swill (from hospitals) and 485 tons of market refuse and many mattresses and some dead animals were cremated. The cost that year was $1,397.86, of which $177.54 was for coal and $690 for labor. The cost of cremation seems to be high in Lowell, but if the figures were as carefully presented, and if the character of the material was as well known, the apparently much lower cost in other cities might possibly be readily accounted for. An attempt was made at Lowell to sell the resulting ashes, but with little success. An analysis showed them to contain 10.21 per cent. phosphoric acid, and potassum oxide 6.01 per cent.[1] Portland, Ore., for some years had a crematory twelve miles down the river and towed the garbage down on scows; but recently a new crematory has been built, about thirty minutes drive from the centre of the city, at a cost of $16,000. The health commissioner states that in 1899 12,520 cubic yards were cremated at a cost of $5,400, or $0.06 per capita. If the garbage was of average weight the cost per ton is about $0.60. In Grand Rapids a crematory was built at a cost of $14,780. The health officer cannot give the cost of operating, but states that a single test gave a cost of $0.21 a ton. His report for 1899–1900, however, states that the expense account

[1] Lowell, Report of Board of Health (1897), p. 10.

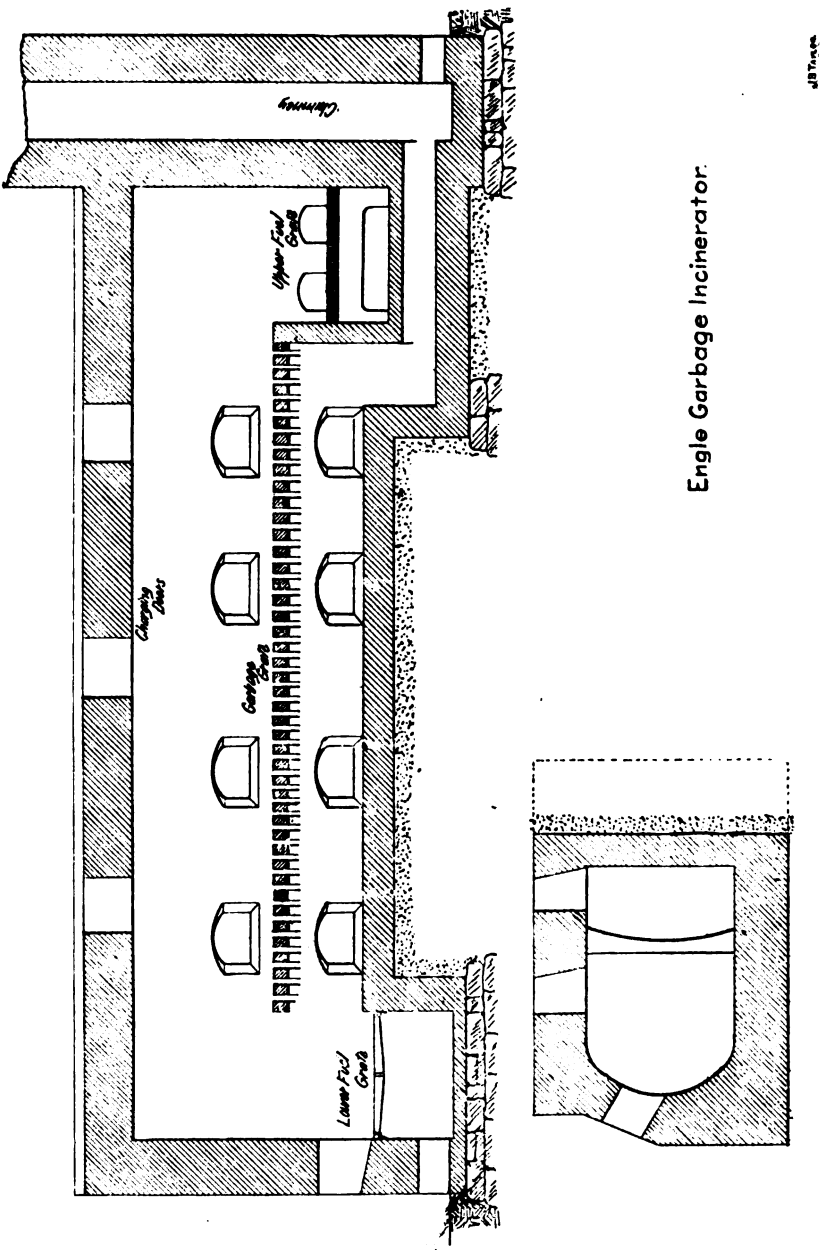


FIG. 88.

Diagram of Engle Garbage Furnace. From Report of the Department of Health, Brooklyn, 1896.

for the year was $3,962.11. In Richmond, Ind.,[1] from 1 May, 1897, to 1 May, 1898, 8,031 cubic yards of garbage were burned with natural gas as a fuel, for $1,639.05. Such an amount of true garbage could not be collected in a city of 25,000 inhabitants, and indeed the report states that 4,964 cubic yards were "dry garbage" which leaves 3,067 yards "wet" or true garbage, or about 2,200 tons, which might be expected in a city of that size. As the 4,964 tons of dry garbage would help the fuel account, nothing definite can be inferred from these figures. A crematory was built in Salt Lake City in 1897 at a cost of $12,000. In 1898 11,059 cubic yards of garbage including many dead animals were cremated at a cost of $4,418.21, or $0.39 per cubic yard. But it must be remembered that much of this "garbage" is combustible material. Three men are employed at the crematory who work in shifts of eight hours.

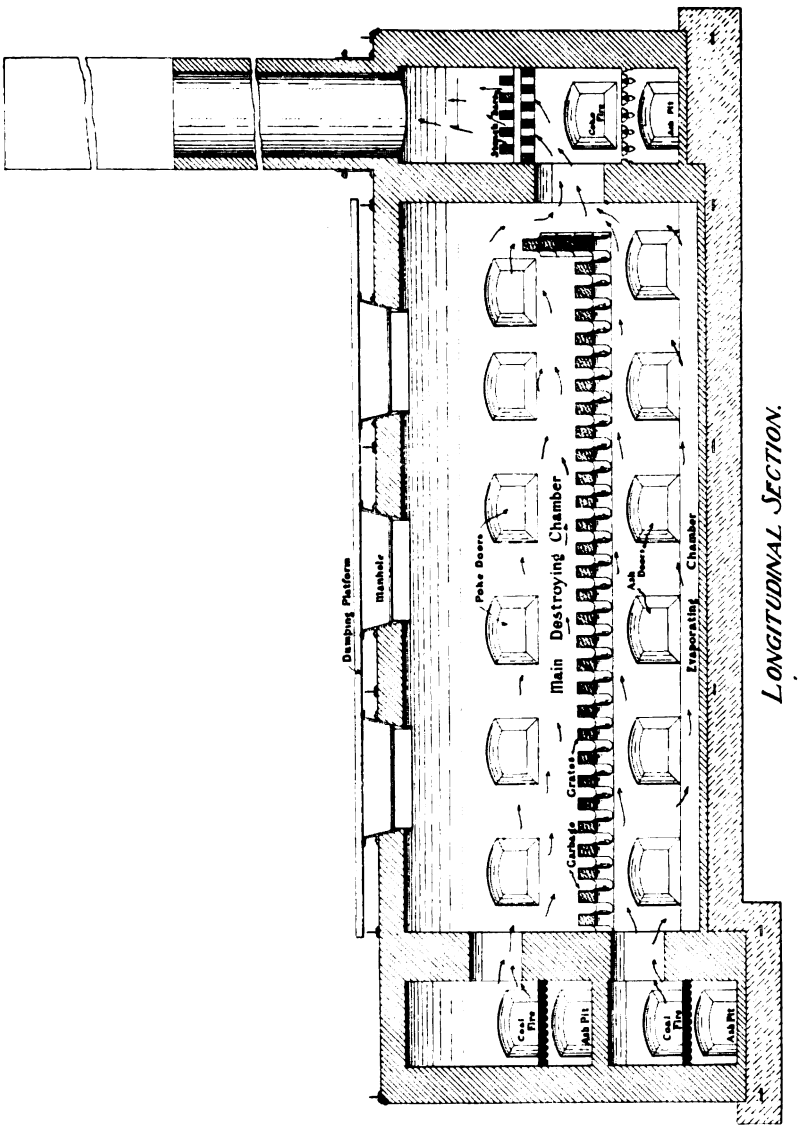
In Richmond, Va., about 7,500 cubic yards of garbage were cremated in 1899 besides many dead animals, at a cost of $3,960.08. Most of the time only one man is employed and $2.75 a ton is paid for coal. Not much over half of this garbage is true house garbage, a very small amount for a city of 105,000, so that the apparently small cost of disposal per capita, $0.037 is misleading. It is probable that the cost per ton is over $0.60, although 1,227 cubic yards of waste paper, etc., were burned, thus helping out the fuel account. Mr. Hering's report states that the crematory at Savannah cost $12,000, and that 120 yards are burned daily at a cost of from $20 to $25.

Dixon Furnace.

This furnace is at present in use at Bridgeport, Conn., Camden, Dayton, Fort Wayne, Joliet, Lafayette, Ind., Louisville, McKeesport, Penn., Memphis, Trenton, Wilmington, Del., York, Pa., and until 1899 was in use in Atlanta. One is soon to be built in Spokane.

In operating the Dixon furnace three fires are required. Two of these are at the end of the furnace farthest from the stack, and they are so arranged that one of them sends its flames over the garbage and the other under the grate bars on which the garbage rests. These fires are made with coal, wood, or gas, and are started in the morning about one hour before the garbage begins to arrive. Another fire, usually of coke, is kept burning at the foot of the stack to consume the half burned gases from the garbage. The garbage is dumped directly from the carts into the furnace where it rests upon the grate bars. The ashes fall through the grate bars and are removed through openings at the sides of the furnace.

[1] Proceedings, Second Annual Convention of League of American Municipalities 1898, p. 35.



LONGITUDINAL SECTION.

FIG. 89.

Dixon Garbage Crematory.

The Atlanta crematory cost $12,190 in 1895. About forty-eight tons per day were cremated that year, at a cost of $0.34 per ton. According to the board of health report about one-third of this weight was night soil, and it must be remembered that garbage in Atlanta includes all dry refuse which assists the combustion. In Atlanta it is said that the crematory burning garbage alone without night soil requires no additional fuel. Such an operation with garbage, as the term is understood at the north, is, of course, utterly impossible. According to the health department report of 1897, 110,204 loads of garbage were collected in that year, and such an amount could only be collected by including a large amount of dry refuse. The furnace in Camden cost $9,990. It is only operated a part of the time, and the expense is said to be about $1 per ton. At Bridgeport a crematory was erected under contract to cremate garbage at a cost not to exceed $0.35 per ton, but at the present writing it is stated by the city clerk that it costs about $0.45 a ton. The crematory at Dayton cost about $33,000. In 1899 it cost for operation $8,074.66, of which $4,278.66 was for fuel, which is natural gas, $1,719.75 for labor, and $2,076.25 for repairs. According to the report of the superintendent, 73,519 barrels were consumed in 1899, of which 6,754 were night soil. As the superintendent of the crematory states in a letter published by the Dixon Company that the garbage weighs about 250 pounds to the barrel (1,000 pounds to the cubic yard) the cost per ton for cremating must be $0.80. It is likely that there is considerable combustible material with the garbage, otherwise the great bulk of 14,191 cubic yards could hardly be collected in a city of 85,000 inhabitants. Furthermore true garbage would weigh over 250 pounds to the barrel. This would tend to lower the price, but the night soil would increase it. In Fort Wayne in 1898 5,235 tons of garbage were cremated at an expense of $2,686.43, of which $1,409.64 was for fuel. The cost per ton for cremation was about $0.50. Memphis has recently constructed two crematories of thirty tons capacity for $7,000 each, and two crematories of twelve tons capacity for $2,700 each. The cost of operating the crematories is not separated from the other expenses of the health department in that city. Trenton has a small crematory which has been advertised as cremating garbage at $0.30 per ton.[1] When the writer visited the crematory in September, 1899, it was not in use, and is not used by the contractor when he can dispose of garbage in any other way. Nothing reliable can be learned from that crematory. In Jacksonville a crematory was built in 1897 at a cost of $15,000. In 1899 3,673 tons were cremated at a cost of $4,000, or $1.08 per ton. As may be inferred from the wagons

[1] Proceedings, League of American Municipalities, Detroit (1898), p. 30.

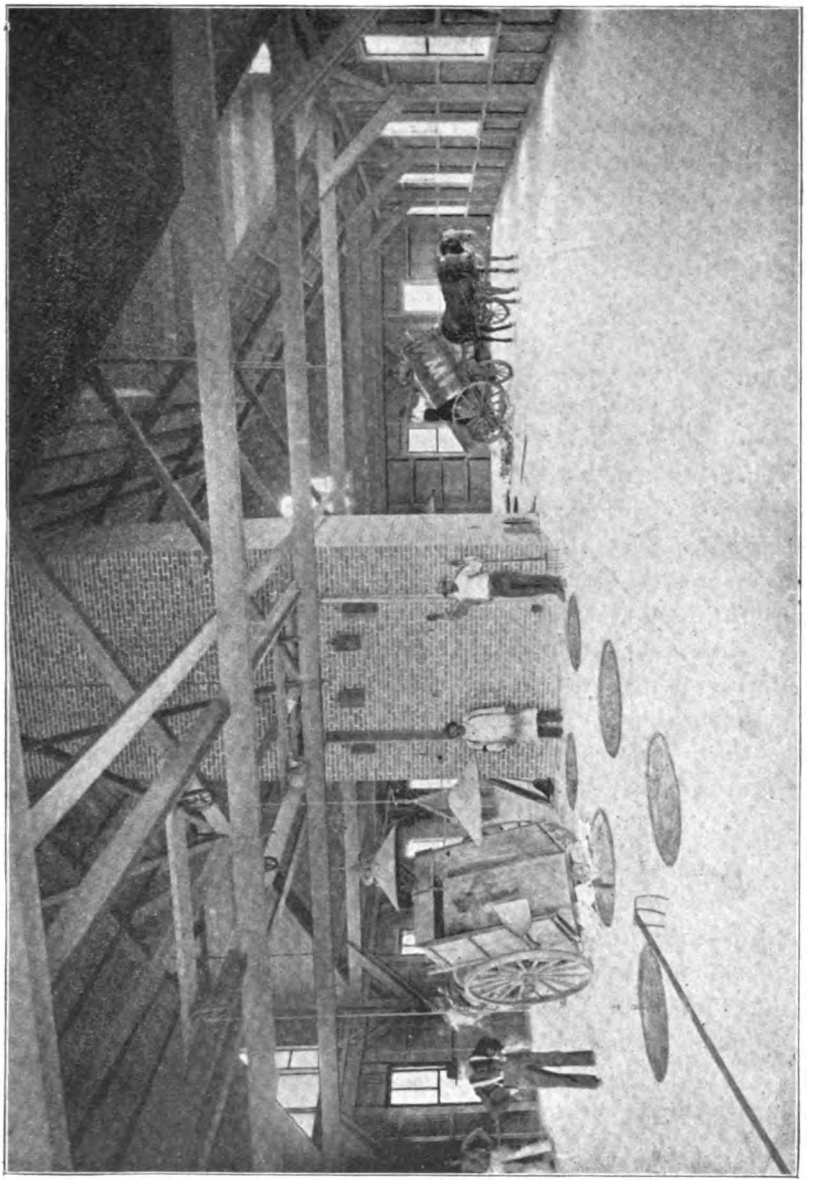


FIG. 90.

View of the Interior of the Dixon Garbage Crematory at Jacksonville, Fla.

shown in the illustration, the garbage contains considerable combustible material. When the writer visited the Wilmington crematory in September, 1899 (the visit was not expected), he found it being operated without any offence whatever. The only objectionable feature was the draining of garbage carts before they entered the building. This was done on a platform from which the water drained to a sewer. The interior of the crematory presented as neat an appearance as that of Jacksonville shown in the illustration. At Wilmington the ashes are sold for from $6 to $8 per ton. They are said to form from five per cent. to ten per cent. of the amount of garbage burned. No data could be obtained from the city officials in regard to the amount of garbage consumed or the cost of cremation. But at the time of the writer's visit four men were employed and a foreman who stated that in August 942 tons of garbage were cremated and 133 tons of coal at $2 per ton were required. This would probably make the cost about $0.60 per ton exclusive of repairs. The crematory cost $16,000 in 1897.

In Camden in 1900, 2,000 tons of garbage were disposed of at a cost of $1,453.50 or $0.73 per ton. In Louisville a 50-ton crematory has been built at a cost of $22,000, and is guaranteed by the Dixon company to cremate for thirty cents per ton, but it has not yet (February, 1901), been accepted by the city, though it is said to give satisfaction. According to the statement of the health commissioner of Joliet, garbage is cremated in that city for $0.20 per ton.

The Dixon company has recently designed another style of furnace in which the garbage is first partially dried in a chamber over the crematory proper. See Figs. 91 and 92.

M. V. Smith Crematory.

This crematory is built by M. V. Smith of the American Stoker Company, Washington Life Building, New York. Crematories of this type have been built at Atlantic City, the District of Columbia, Muncie, Ind., Philadelphia, and Wheeling. The furnaces at the District of Columbia and Philadelphia are no longer used. The following description is by William C. Woodward, health officer of the District of Columbia:[1]

"The crematory may consist of any number of furnaces arranged in pairs around an apparatus for the generation of the gas used as fuel. Each furnace is an upright iron tank, lined on the inside with fire brick, and is connected, on one side by underground flues, one leading from the gas generator and the other to a chimney common to both furnaces of the pair, and on the other side by a short flue, with the other furnace of the pair. The opening for the reception of garbage is in the top of the furnaces. The ashes are raked out from an opening low down in the side. There is no grate, the garbage resting on the bottom of the furnace and burning only on top. In the flue leading to the chimney is a mass of checkerwork of fire

[1] District of Columbia, Report of Health Officer (1896), p. 230.

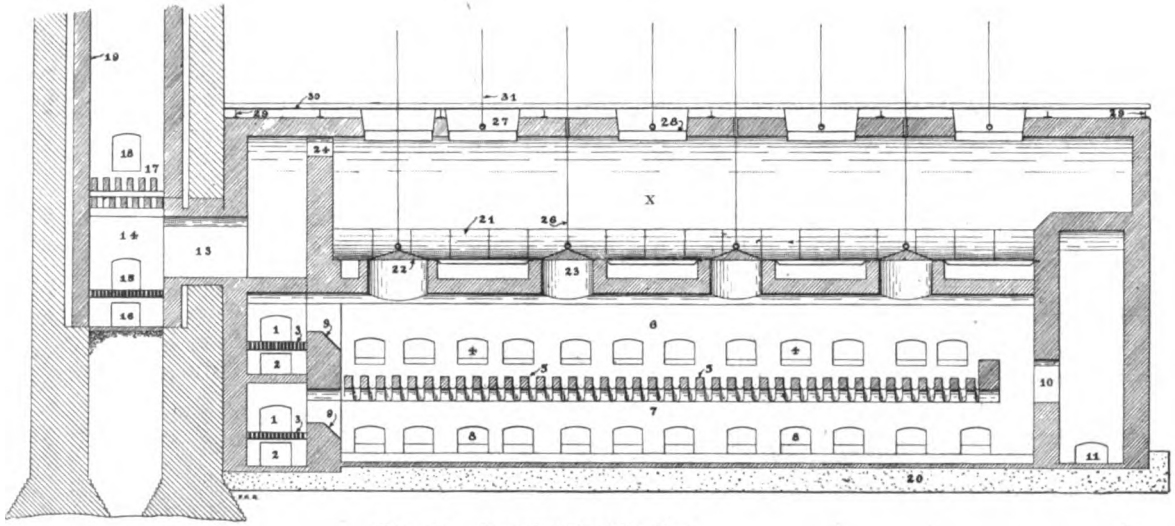


FIG. 91. Longitudinal Section.

x Drying Chamber.
1. Coal Fire Box.
2. Ash Pit.
3. Grate Bars.
4. Poke Doors.
5. Garbage Grates.
6. Main Destroying Chamber.
7. Evaporating Chamber.
8. Ash Doors.
9. Bridge Wall.
10. Opening through Bridge Wall.
11. Clean-out Door.
12. Return Flues.
13. Entrance to Stack.
14. Stench-consuming Chamber.
15. Coke Fire Box.
16. Ash Pit.
17. Stench Bars.
18. Door.
19. Fire-brick Stack Lining.
20. Foundation.
21. Iron Arches over Return Flues.
22. Charging Hole Covers.
23. Charging Hole (Fire-brick).
24. Vent of Drying Chamber.
25. Fire-brick Furnace Lining.
26. Chain Cover Hoist.
27. Garbage Manhole (Cast-iron).
28. Cast-iron Manhole Cover.
29. "T" Buckstays.
30. Steel-plate Platform.
31. Manhole Cover Hoist.

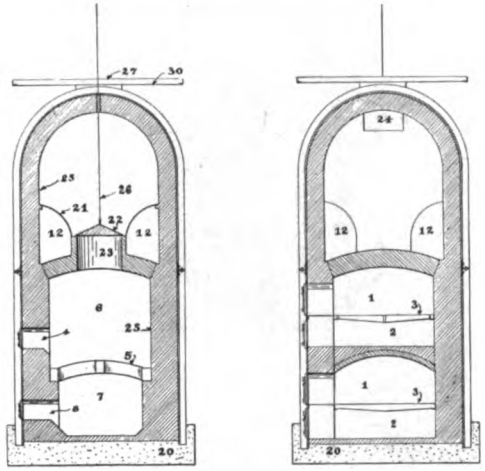


FIG. 92. Transverse Sections.

DIXON RETURN DRAFT FURNACE.

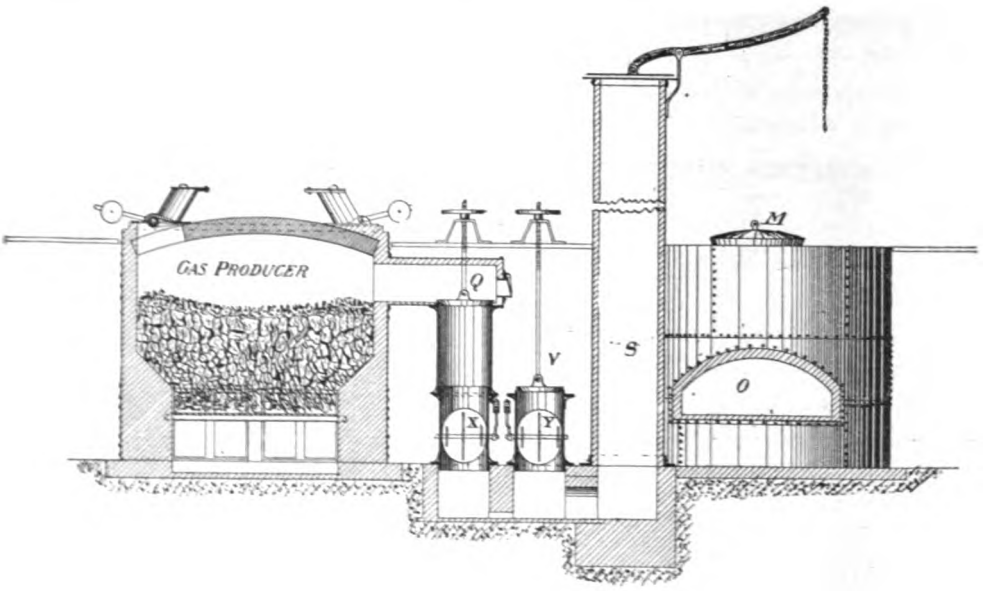


FIG. 93.

Diagram illustrating the Gas Producer of the Smith Crematory and its connection with the Checkerwork Chamber.

brick, to insure the complete destruction of offensive gas. Valves to control the flow of gas are set in the flues.

"The crematory is built so as to allow the carts to drive to the top and dump their contents directly into the furnace, and is not inclosed in a building. Each pair of furnaces is independent of all others. All are dependent, however, on the proper operation of the gas generator.

"The operation of any pair of furnaces is as follows: Carts drive to the top of the crematory, depositing all garbage into one furnace, filling it to the proper height. The gas is then made to pass directly from the generator through the flue, where it is mixed with air to support combustion, to the charged (proximal) furnace. The flame attacks the mass of garbage in it, and then passes through the communicating flue into the empty (distal) furnace, and thence to the flue leading into the chimney. The brick checkerwork in this flue is so intensely heated by the flame, and secures by its arrangement such thorough contact with the gases from the garbage, that they are completely decomposed and free from objectionable odor, and so find their way out of the chimney.

"While the contents of the proximal furnace are being burned the garbage is emptied into the distal furnace, where it is warmed and partially dried by the flame, which, as has been previously described, passes through this furnace during this time. As combustion progresses in the proximal furnace the ashes are raked off the top of the mass through the door in the side. When the entire charge has been burned, the direction of the flame is reversed by means of valves, so that it passes into the furnace which has just been filled. This now becomes the proximal furnace, and the place of combustion. The other becomes the distal furnace, into which the garbage is dumped, warmed, and partly dried. The direction of the flame may be reversed as often as desired. The operation of the furnace is, therefore, continuous.

"The operation of the Smith crematory was witnessed in September, 1894, in Atlantic City, N. J. The plant is owned and operated by the city, and has fully

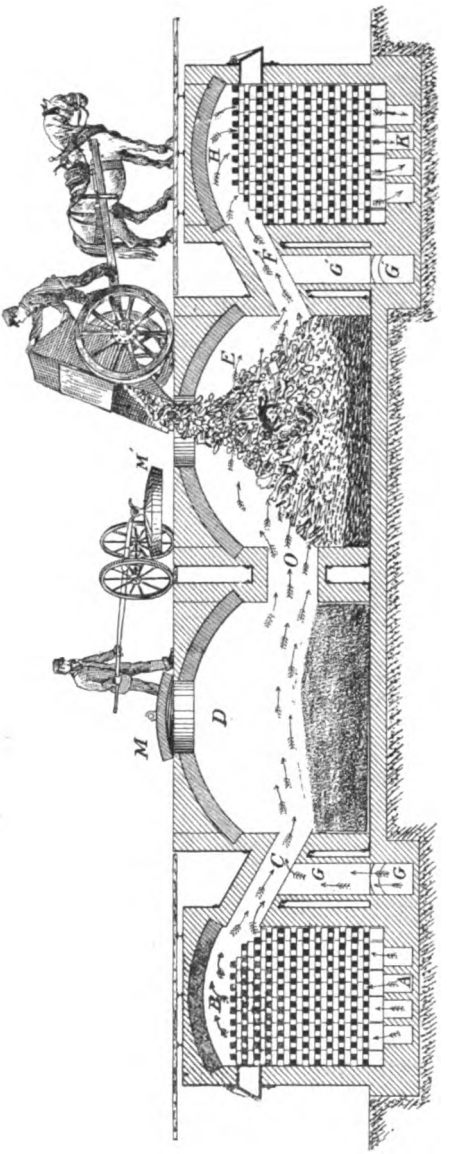


FIG. 94.

Diagram illustrating the Smith Garbage Crematory and showing the two Combustion Chambers for Garbage which are filled alternately, and the Checkerwork Chambers

demonstrated its ability to burn pure garbage in large quantities and without nuisance. The only objectionable feature at the time of inspection was the leaking of water from the garbage around the lower doors of the furnace, even when closed. This water saturated the soil near by, giving to the place a faint sour smell, characteristic of garbage. The crematory is located in the immediate vicinity of a poor class of dwellings."

The crematory at Muncie cost $5,000, and according to a letter received from the chairman of the garbage committee, 3,705 tons were cremated in 1899 at a cost of $3,532.49, or $0.90 per ton. The cost of repairs included in the above was $488.39, which is about the annual average.

The crematory at Atlantic City cost $65,000 and has eight cells with a capacity of twenty-five tons in twelve hours. In August, 1900, 3,700 tons were consumed. The operating expenses in 1900 were $11,280, of which $6,214 was for coal (steam coal being $3.25 per ton), $4,166 for labor, and about $900 for repairs. The amount of garbage cremated was 11,463 tons. This furnace is exceptionally large for the annual consumption of garbage, for during a few weeks of the summer it must receive the garbage of over 200,000 people.

Brown Crematory.

This crematory is built by McBarron & Co., 39 to 45 Oliver Street, Boston. One was built in the District of Columbia but has now been abandoned. Another is used by the contractor in Troy to cremate such of the garbage and refuse as he cannot use for filling. The crematory in Troy cost $10,000. In the Brown furnace the flames are driven over the top of the garbage to the end of the furnace and then back again underneath. The furnace is surrounded by a water jacket. Dr. Woodward stated that its operation in the District of Columbia was satisfactory from a sanitary standpoint. No figures could be obtained of the cost of operating.

Rider Crematory.

The builder of this furnace is W. W. Patrick of Pittsburgh. The only furnace in operation is at Allegheny, and no data could be obtained by the writer, but according to Hering's report the crematory cost $5,300 and the cost of cremating was about $0.25 per ton.

Brownlee Crematory.

Crematories of this type have been built at New Brighton, Staten Island, San Antonio, Gainesville, Tex., and Terre Haute. The cost of the crematory in the latter city was $7,000. During the last six months of 1899 2,000 tons of garbage were cremated at a cost of $1,035.35, or about $0.50 per ton.

Vivartos Crematory.

This is said to be in use at Scranton.

Ideal Crematory.

A crematory known as the Ideal is in use at Findlay, O. About 200 cubic yards per month are burned by contract at a cost of $117.

McKay Crematory.

One of these was built at Yonkers at a cost of $5,000. Hering states that from twenty to twenty-five tons per day in summer and ten to fifteen in winter are cremated, at a cost of about $3,000 per annum. According to a letter from the commissioner of public works the cost of operation in 1900 was $3,526. The United States commissioner of labor states that 6,260 tons were cremated which is a large amount for a city of that size. These figures would make the cost per ton $0.56.

Lester Furnace.

The only furnace of this kind is at Atlanta. It was built in 1899 by the Dennis Cremation Co., of Atlanta. The city does not own the crematory but contracts for the cremation of garbage at $12,000 per annum, or about $0.12 per capita.

Risley Furnace.

There is a furnace of this type at Houston, Tex., built at a cost of $8,000. In 1900 there were consumed 19,348 cubic yards at a cost of $3,362.62. Of course a large part of this was combustible refuse as is common in southern cities.

Dry Refuse.

While almost all cities are convinced of the importance of the municipal collection of garbage, they are by no means all convinced of the advantage of the systematic removal of other forms of waste, particularly ashes and general rubbish. When such material is collected by the city and separately from garbage it is usually called dry refuse, but in the south it is more commonly known as trash. Sometimes this material is still further separated into ashes and dry refuse or rubbish, the latter term including all kinds of rubbish except ashes.

If all decomposable refuse was actually put into the garbage pail there would not be so much need of the municipal collection of dry refuse; but such is never the case even in those cities where separation is carried out in the best manner. Some offensive matter is sure to get into the ash bin or ash pile and create more or less of a nuisance. Moreover, the very existence of an ash pile is a temptation to throw all kinds of refuse, slops or garbage upon it. Unless there is municipal collection, the landlord or householder is pretty certain to remove the

dry refuse [illegible] in the better class of houses. There [illegible] remains almost all the time in each yard or cellar, a pile [illegible] of four is more or less [illegible] than private [illegible] it, but it is really [illegible] event and the systematic [illegible] satisfactory, but [illegible] method of private [illegible]

Dry refuse [illegible] which [illegible] markets and the like. It [illegible] are often [illegible] the ashes [illegible] at [illegible] but the [illegible] ashes are not [illegible] In Salt Lake City on [illegible] and in [illegible] Manufacturing [illegible] collection. [illegible] generally collected. [illegible] and Florence. [illegible] in [illegible] grass and sweepings are [illegible] removed if [illegible]

[illegible] ashes, garbage, grass, manure [illegible] found upon premises [illegible] from the superintendent [illegible]

The [illegible] domestic [illegible] A similar [illegible]

[illegible]

[illegible]

[illegible] are requested to place their [illegible] premises between [illegible] Monday, May 3 [illegible] May 7, when they [illegible] be allowed [illegible]

In Asbury Park, Boston, Brockton, Brookline, Lawrence, Lowell, New York, Richmond, Utica, Yonkers, and perhaps some other cities, dry refuse at least in certain sections of the city is collected separately from ashes. In Augusta, Ga., in 1899, an ordinance was passed to require persons who had much of this refuse to tie it in bundles or pack it in bags. But it was found to be entirely impracticable to enforce it.[1] In 1896 Mr. Waring in New York instituted a change in the collection by which the wastes of the city were to be collected in three separate divisions, garbage, ashes, and dry refuse or general refuse. The separation of other dry refuse from ashes is not complete as yet, but nevertheless large quantities are collected in that manner, and at least two furnaces have been built for its disposal. In Boston in 1897 the separation of dry refuse from ashes was begun. The rules of the street cleaning department in regard to such separation are given below.[2]

The card shown in Appendix 115 is also very generally distributed about the city, especially among school children.

In Asbury Park only the dry refuse exclusive of ashes is removed by the city.

The average weight of a cubic yard of dry refuse including ashes is given as 1,000 pounds in Cincinnati, 800 pounds in Evansville, 750 pounds in Boston, and in Buffalo 500 pounds.

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place any dirt, ashes, filth or rubbish of any kind whatever in any of the ways, streets or places of the city, without a permit from the superintendent of streets.

"Dirt of any kind not to be placed in the streets on Saturday."

BENJAMIN W. WELLS,
Superintendent of Streets.

CITY HALL, BOSTON, 1897.

NOTE. — This circular, printed in English, Hebrew and Italian, was posted in prominent places by the regular bill posting companies, and for a week was also carried on the sides of all the wagons and carts owned by this division.

[1] Augusta, Report of Board of Health (1899), p. 59.

[2] "On and after Monday, October 11, 1897, nothing but garbage, food cans, and food bottles must be put into the garbage receptacles, and nothing but dust and ashes must be put into the receptacles for ashes.

"All papers, light waste, and other general refuse must be placed in a third receptacle, or, if too bulky, must be tied in bundles to prevent their being scattered in handling, and must be protected from the weather until collected by the proper authorities.

"REVISED ORDINANCES OF 1892, CHAPTER 43, SECTION 17. — No person shall place or keep in or near any building, ashes or cinders in such a manner as to be liable to cause fire, nor mix them with other substances, nor place or keep them except in metallic vessels, so placed as to be easily removed.

"The superintendent of streets, therefore, calls attention to the necessity of keeping ashes and other refuse matter as required by law, and gives notice that no refuse will be removed unless protected from the weather, and placed so as to be easily removed, and kept as follows: —

"Ashes must be kept free from all other refuse matter and in metallic vessels."

The weight of dry refuse exclusive of ashes is 165 pounds per cubic yard in Lowell, 300 pounds in Asbury Park, and 205 pounds in Boston.

Receptacles.

There are comparatively few regulations in regard to the receptacles to be used for dry refuse. Galvanized iron cans are very generally recommended and are in common use. For this use they are not open to the same objections which attaches to their employment for garbage cans and they are reasonably durable. All sorts of barrels and boxes are used to some extent in almost all cities: but as a large part of dry refuse is combustible, and as hot ashes are liable to be placed in the receptacles, or ashes accidentally dropped into them, it is much safer to have them of metal or otherwise made fire proof, and this is required in Boston, Brooklyn, Buffalo, Chelsea, Chicago, Denver, Jackson, Jersey City, and New York. The Boston rule is shown on page 729.

The New York City ordinance and those copied after it require the receptacles to "be made or lined with some suitable metal." In Chicago they are only required to be of iron in the central districts of the city, and they are also required to have iron covers. In Denver brick bins are permitted for ashes, otherwise they must be kept in metal receptacles. Brick bins shaped like a bee-hive and holding about a load are found in nearly every yard in that city, but there is no municipal collection. Doubtless similar rules are found among the fire regulations of other cities. It is not usually required that refuse receptacles shall be covered.

The size of the receptacle is not generally specified, but in Philadelphia it must not weigh over one hundred pounds. In Chicago if of a greater capacity than two bushels, it must be provided with handles at the sides midway between the top and the bottom.

Location.

Receptacles for dry refuse are less objectionable on the sidewalk than are garbage receptacles. Little mention was made of their location in the reports made to Mr. Hering's committee, and it was not thought worth while to make a special enquiry. Probably those cities which require that garbage receptacles be placed outside the premises require that refuse receptacles shall be placed there also. Besides these the following, which require that garbage shall be kept on the premises, direct that ashes shall be kept on the sidewalk: Cambridge, Lowell, Philadelphia, Somerville, Syracuse, and Salem. The Cambridge rule is given below.[1]

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[1] Cambridge, Ordinances, Chapter 24:

"SEC. 28. Whoever desires the removal of ashes accumulated from the burning of materials for heating or domestic purposes only, and other house dirt, not includ-

In Syracuse it is required that the empty barrels shall not remain on the sidewalk over an hour. The barrels must also never be more than half filled. In Springfield, Mass., the ash receptacles are kept in the cellar, from which they are removed by the contractor.

Frequency of Removal.

Dry refuse is not usually collected as frequently as garbage. The data obtained were not as complete as for garbage, but for the cities reporting they were as follows: Refuse is collected at irregular intervals in Allegheny, Columbus, Nashville, and Omaha; "when necessary" in Davenport; when "set out" in Milwaukee. It is collected six times a week in Brooklyn, Holyoke, Mass., and New York, and in the central district of Buffalo; from the hotels, stores, and tenements of Boston Haverhill, and Macon; and in summer time in Adrian, Mich. It is collected four times a week in the business parts of Boston. It is collected three times a week in Newburgh, Norfolk, San Jose, and certain parts of Manchester, and in New Brighton. It is collected twice each week. in Richmond, the greater part of Buffalo, Boston, Brockton, Adrian in the winter, and Paterson in the summer. The most common interval between refuse collections is one week. Weekly collections are the rule in Boston, Cambridge, Haverhill, Macon, New London, Newport, Newton, Philadelphia, Rochester, Sioux City, Somerville, Springfield, O., Utica, Wilmington, Buffalo, and Paterson in the winter.

Hours for Removal.

The hours for the removal of ashes are usually the working hours of the day, but often it is the custom to collect ashes in the early morning hours, especially in the business districts of the great cities.

Vehicles for Dry Refuse.

In almost all cities dump carts are used for collecting the dry refuse, especially when it includes ashes. Usually these carts are made of wood, though in Wilmington, Del., Flanagan metal carts are employed,

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ing offal, shall cause the same to be put in suitable boxes or barrels, and set upon the sidewalk adjoining his premises, and the superintendent of streets shall cause such removal to be made at least once in each week, on stated days for different portions of the city; but such boxes or barrels shall not be placed upon any sidewalk so as unnecessarily to prevent the convenient use thereof by travellers. Wherever there is a convenient driveway into a yard connected with any dwelling-house, the superintendent of streets may, at his convenience and upon reasonable notice, cause the city teams to be driven into such yard, and to remove therefrom the ashes and rubbish before mentioned that may be accumulated therein, at the times hereinbefore specified.

"Any person having or leaving after dark any ashes, rubbish, or other refuse on any street shall cause a lighted lantern to be kept thereon during the night.

"In Common Council, April 18, 1899."

and occasionally metal carts like those shown in page 696 are used. It is probable that in a large proportion of cities, perhaps a majority, covers are required for refuse wagons, though in was not definitely stated in Mr. Herring's report. The following cities at least require covers, and in all of them carts with covers are permitted and used: Asbury Park, Boston, Brockton, Buffalo, Lowell, Lynn, New Brighton, Newport, Newton, Paterson, Philadelphia, Revere, and Somerville.

In the following towns are the only reported: Chelsea, Dayton, Fitchburg, Manchester, Nashville, and Utica.

In most cities the horse and cart are used with each cart, but when larger wagons are used there may be two horses and two men. In a few cities, as Boston, Cambridge, and Chelsea, when single carts are employed with one driver, other helpers accompany the cart along the street.

In Omaha it is reported that the refuse wagons carry five cubic yards; in Philadelphia, three cubic yards. In Boston the refuse carts have a capacity of 64 to 81 cubic feet; in Lynn, 50 cubic feet; in Cambridge, 45 cubic feet; in Paterson, 40 cubic feet; in Richmond, 27 cubic feet.

In Asbury Park where ashes are excluded from the refuse, iron carts are used which are described as follows: They are made by Thomas Hill of Jersey City. Similar carts are used in Boston and New York. In Boston wooden paper wagons are used, made by the street department, which cost about $[illegible].

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[1] Asbury Park Report of Board of Health, 1898, p. 31.

[2] The carts which have been especially designed for use in the cities and towns of from 10,000 to 15,000 inhabitants and large boroughs are near to the ground to insure of least noise.

[3] They have two iron wheels with 4-inch tread and the top of the body stands 31 inches from the ground, while the rear of the bottom of the body is 21 inches from the ground.

[4] Extending all the way around the cart over the top of the sides of the body, and which projects 4 inches, is an iron rod and strip used to prevent the sides from bulging in when loaded.

[5] The cart is provided at the rear with two hinged doors which, when open, permit of the quick discharge of the load in the cart.

[6] These carts weigh, empty, 900 pounds, the weight being supported from the shafts on the horse's back. Experiments have shown that when judgment is used by the driver of the cart in loading the cart it is evenly balanced that when loaded it is not tilted either to the front or rear, the gross weight resting on the horse's back.

[7] The tool box, weighing 50 pounds, is placed on the back of the horse by a driver weighing 150 pounds, making the total weight of the cart and load 1,100 pounds.

[8] The inside dimensions of the body are as follows: Length, 144 inches; width, 54 inches; depth, 30 inches, giving a capacity of 64.75 cubic feet, or 2.40 cubic yards.

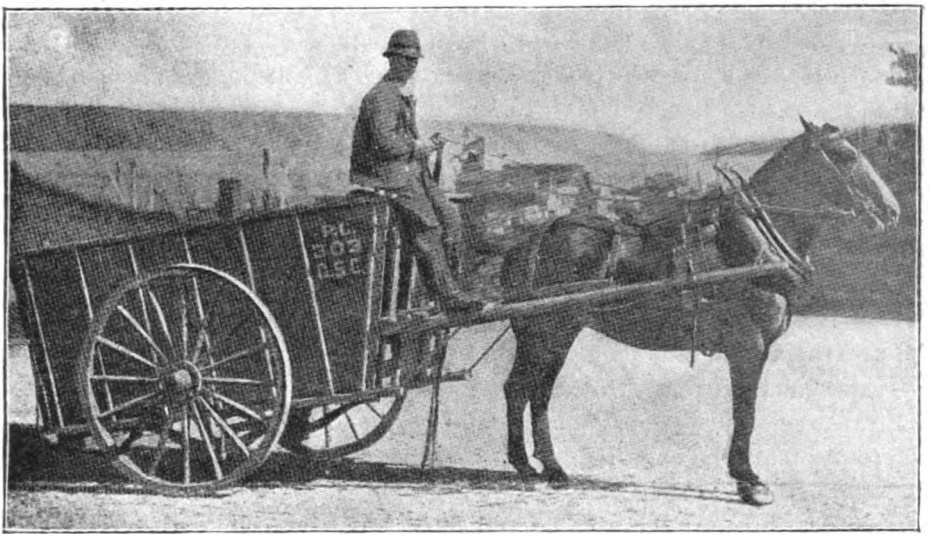

FIG. 95.

Paper Cart, Asbury Park, N. J. From plate loaned by the maker of the cart, Thomas Hill, Jersey City.

Below[1] is a list of the cities in which there is a municipal collection of dry refuse, and it is also shown whether the work is done by contract, and what department has it in charge.

Disposal of Dry Refuse.

When dry refuse is collected separately from garbage the most of it, except from markets, produce dealers, etc., where a perfect separation is almost impossible, is comparatively clean and may very properly be used for filling low land, and some of it even utilized in laying sidewalks and cellar floors. Ashes are also employed in the floors and par-

[1] Health Department. Asbury Park,* Atlanta,† Chelsea,* Florence, S. C.,† Galveston,† Lawrence,† Lowell,† Lynn,† Macon, Ga.,† Malden,† Newport,* Newton,* Paterson,* Richmond,† Salem,† Salt Lake City,† Somerville,† Syracuse.†

Street Department. Boston,† Brockton,† Brookline,† Buffalo,* Cambridge,† Camden,† Cincinnati,† Dayton,† Fall River,† Fitchburg,† Hartford,* Manchester,† New London,* Utica,* Wilmington, Del.*

Street Cleaning Department: Baltimore,† New York.†

Department of Public Works: Davenport,* Detroit,* Milwaukee,† New Bedford,† Norfolk,† Philadelphia.*

Fire Department. Battle Creek, Mich.†

Poor Department. Haverhill.†

Executive Board. Rochester.†

Ash Committee of the Council. Springfield, Mass.*

* By contract.

† By city employees.

titions of fire-proof buildings.[1] The ultimate disposal of most dry refuse collected by municipalities consists in dumping on low land. Usually such land is conveniently situated in the city or its immediate suburbs, so that a long haul is not required. Usually the owners of such land are only too glad to have it brought to grade in this way and readily donate it for this purpose. Sometimes, however, the city is required to pay something for the privilege. This is true of Fitchburg, and in Portland, Ore., the city has to pay $15 per month for a dump, and in Utica $60 per month.

It is often necessary to keep a man stationed upon a public dump to prevent illegal dumping of filth, to keep the dump level, to burn the paper and prevent the intrusion of scavengers. This usually constitutes the only cost of this method of disposal.

As might be expected, it is sometimes possible for a city to sell some of its ashes. The following are the prices asked and the amount realized in certain cities:

City.	Year.	Price Per Load.	Amount Received.
Brockton	1896	10c	
Cambridge	1896	15c	$ 802 25
Chelsea	1896	12c	
Lynn	1895		1,278 81
Somerville	1896		49 10

TABLE SHOWING THE AMOUNT OF DRY REFUSE COLLECTED AND THE COST OF COLLECTION IN A NUMBER OF AMERICAN CITIES.

City.	Population, Census of 1900.	Year to which data refer	Amount Collected.	Cost of Collection.
Asbury Park	4,148[2]	1899	7,402 cu. yds.	$1,800 00
Boston	560,892	1899	329,096 loads[3]	208,350 47
Baltimore	508,957	1900	218,507 cu. yds.	98,256 67
Brockton	40,063	1899	9,568 loads	
Brookline	19,935	1900	29,561 cu. yds.	11,202 60
Brooklyn	1,166,582	1898	1,488,600 cu. yds	237,000 00
Buffalo	352,219	1900	307,341 cu. yds.	50,000 00
Cambridge	91,886	1898	39,045 loads	21,198 55
Cincinnati	325,902	1899	258,648 tons	
Dayton	85,333	1899	17,528 tons	10,162 00
Detroit	285,704	1898	80,000 loads	
Fall River	104,863	1899	4,532 tons	
Hartford	79,850	1900	54,000 cu. yds.	15,000 00
Haverhill	37,175	1899		4,500 00
Holyoke	45,712	1899	9,600 tons	19,000 00
Lawrence	62,559	1899	12,000 tons	14,300 00

[1] Report on the Final Disposition of the Wastes of New York. George E. Waring, Jr., 1896, p. 132.

[2] Resident population. The summer population is probably over 30,000.

[3] A load equals about 54 cu. ft.

City.	Population, Census of 1900.	Year to which data refer.	Amount Collected.	Cost of Collection.
Lowell	94,969	1899	26,572 loads	$10,903 30
Lynn	68,513	1899	33,207 loads	12,476 85
Malden	33,664	1900	13,961 loads[1]	4,577 75
Manchester, N. H.	56,987	1899	18,000 cu. yds.	17,500 00
Newton	33,587	1899	.....	4,900 00
Newport	22,034	1900	20,000 cu. yds.	2,988 00
New York (Manhattan)	1,850,093	1898	876,400 tons	592,500 00
Paterson	105,171	1899	.....	.....[2]
Philadelphia	1,293,575	1899	625,459 cu. yds.	.....
Rochester	162,435	1899	206,272 cu. yds.	67,285 71
Salem, Mass	35,956	1899	10,582 cu. yds.	2,912 00
Somerville	61,643	1899	29,093 loads	7,840 83
Springfield, Mass	62,059	1900	.....	11,000 00
Syracuse	108,374	1899	24,353 loads[3]	18,508 25
Utica	56,383	1899	.....	4,800 00
Wilmington, Del	76,508	1899	.....	7,500 00
York, Penn	33,708	1899	2,726	1,880 39

Ashes contain a considerable amount of unconsumed coal. Experiments in New York City have shown that the average ash in that city contains twenty per cent. of unburned coal, but probably much of this is very finely divided. Little soft coal is burned in that city. The attempt is made to utilize this coal in the ashes in those crematories where mixed wastes are burned as in the Thackery crematory. Otherwise no attempt has been made to save this waste.

In a few instances dry refuse is dumped into the ocean or a large river. In Sioux City it was reported in 1896 that it was dumped into the Missouri river, but the method was not approved of. In Boston and in Lynn where the best of the garbage is sold to farmers and where the best of the dry refuse is used for filling, the rest of the garbage and dry refuse is deposited together on scows and towed to sea. In Boston in 1898 112,528 loads of refuse or twenty-eight per cent of the whole 394,937 loads collected, was towed to sea. Sometimes the federal government steps in and forbids the dumping of refuse into navigable waters as has been done in New York by the supervisor of the harbor under acts of Congress of 28 June, 1888, and 18 August, 1894. Dumping in the Ohio and Mississippi rivers, has it is stated, been forbidden, but the writer has not been able to find the acts. The details of this method of disposal will be further considered in the discussion of the disposal of mixed refuse.

[1] A load equals 27 barrels.

[2] Cost of collection and disposal of ashes and garbage, $27,500.

[3] A load equals 3 cu. yds.

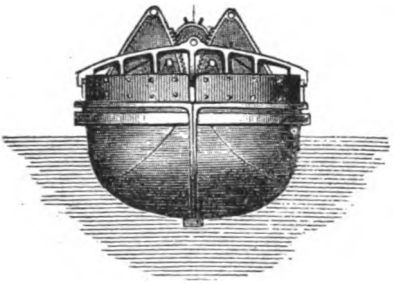

FIG. 96.

Barney Dumping Boat, loaded.

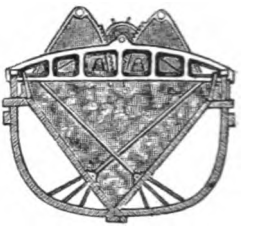

FIG. 97.

Barney Dumping Boat, loaded, sectional view.

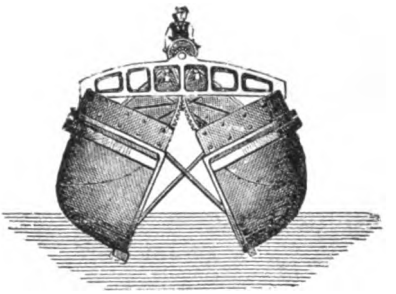

FIG. 98.

Barney Dumping Boat, after discharge at sea.

Refuse may be carried to sea in various ways. The simplest is to use ordinary deck scows which are towed to the dumping ground by a tow boat. Such scows must be unloaded by hand labor which often makes their use expensive. If the deposit is made in the open ocean the danger is greatly increased from the number of men carried, the unseaworthy character of the vessels and the time taken to unload. The City of New York owns two self propelling steam dumping boats, but they have not proved entirely satisfactory. Probably the best and cheapest method of getting refuse to sea is in the Barney scows made by the Barney Dumping Boat Co. of New York. In that city the street cleaning department charters thirteen of these scows at $35 per day. The city also pays $46 for towing two scows to sea and back making the total cost of disposal $0.12 per cubic yard. These scows are also used in Boston where two are owned by the city. In Boston in 1898, 373 trips were made at a cost of $71.02 per trip or 15 cents per cart load of refuse carried to sea.

A considerable amount of dry refuse is combustible and burning is the most effectual way to get rid of it. When refuse is used for filling low land a man is often stationed on the dump to burn paper brought

there in order to prevent its blowing away, and also to improve the character of the filling. In Asbury Park all dry refuse which is collected separate from ashes and garbage is burned in this way in the open air on the ground. In Evansville, Lowell, Muncie, Yonkers, and many southern cities, the combustible part of the dry refuse is burned in the garbage crematory together with the garbage, thus lessening the cost for fuel. In Pittsburgh some of the combustible dry refuse is burned in the old garbage furnace.

The valuable junk material found in dry refuse is usually recovered to a considerable extent by rag pickers who swarm over the dumps and who usually make themselves a nuisance by interfering with the leveling of the dumping, and by setting fire to rubbish. In Troy the contractor sorts out the junk from the refuse. Chicago and the city of New York are the only cities reporting which receive any income from this source. Chicago received in 1896 the sum of $100 a month for the privilege of picking over the dumps. In New York in 1898,

"the money paid by the contractor for the privilege of picking over the rubbish dumped with the ashes and street sweepings at the various dumps, after furnishing the department with sufficient labor for trimming all the scows and dumpers carrying ashes, street sweepings and rubbish, for operating the chute dump at Seventeenth street, East river, and for unloading, at night, the temporary storage bin for garbage received during the day at Lincoln avenue, amounts to $53,691.62. This gives for 96,000 tons an average payment of $0.56 per ton."

In Boston and New York alone is the attempt made to utilize the junk found in dry refuse. In both these cities the utilization is joined with cremation as a method of ultimate disposal of the lighter portions of dry refuse (excluding ashes), particularly that collected from business sections. In Boston the contract went into effect in January, 1899, and is for ten years, but the city has the privilege of buying on appraisal at the end of five years. The land was given rent free by the city, but the buildings and machinery were erected by the contractors. The plant is situated in the business portion of the city near one of the refuse wharves.

The contractor receives $5,500 per annum for destroying or disposing of all dry or combustible refuse which is delivered by the city wagons. Recently the same parties have made a contract with the adjoining town of Brookline to dispose of the combustible refuse of that town for $1,875 per annum, the town agreeing to deliver twenty-five loads a day. It is proposed to build a new destructor in Brighton (a part of Boston), to receive the wastes of Brookline and that part of Boston. The plant consists of a large room into which the wagons drive and deposit their loads. A long travelling apron runs from the front of this room back through it into the furnace room where it discharges

[illegible] [illegible] [illegible] [

or metal lined, but in Memphis it is stated that the rule is not enforced, and in Chicago ordinary wooden boxes are in common use. In Elizabeth, Meriden, and Tacoma galvanized iron cans are reccommended, but they are not in general use. In fact the regulations and the reports of the different cities would indicate that little is accomplished in the way of controlling the receptacles for mixed refuse, and that ordinary barrels and boxes are generally used for this purpose.

Location of Receptacle.

The receptacle must be placed on the sidewalk in almost all cities, usually on the curb line. It must be set out in time for the collection. In Chicago it must be promptly returned to the premises when emptied. The only cities in which the receptacle is required to be kept on the premises for the collection are Chicago, Jacksonville, and Memphis, and in the two latter cities the rule is more often violated than observed.

Hours for Collection.

Usually collection of mixed garbage takes place during the day, but in Mobile it is between 5 and 8 A. M., and in the central portion of Chicago before 7 A. M.; and in the central portions of Meriden, Conn., before 9 A. M.; in Charleston before 10 A. M. in summer and 12 M. in winter; in Louisville before 10 A. M.

Frequency of Collection.

Mixed garbage is collected daily in Charleston, Long Island City, Mobile, and formerly in New York, and in the central portions of Chicago, Raleigh, Elizabeth, Newark, Meriden, Sacramento, Seattle; and in the summer time in Petersburgh. It is collected three times a week in certain parts of Chicago, Jersey City, Louisville, Newark, and Orange. It is collected twice a week in certain parts of Chicago, in the side streets of Elizabeth, Raleigh, and Meriden, in Memphis in the summer, and in Petersburgh in the winter. It is collected once a week in Troy, from the residences of Seattle and in the winter in Memphis.

Vehicles for Mixed Refuse.

The regulations in regard to the vehicles required for mixed refuse are not much more strict than for dry refuse wagons. In eight cities covers are required, canvas in all cases except in Troy where wooden covers are used. In Newark, Jersey City, Meriden, Tacoma, Troy, San Francisco, and formerly in New York City it was stated that covers were not required.

Usually dump carts are employed with one horse and one man. In Jersey City and New York the Hill cart shown on page 683 is used.

Below[1] are given a number of cities in which garbage and ashes are collected together, and also the department which has charge of the work.

TABLE SHOWING THE AMOUNT OF MIXED REFUSE COLLECTED AND COST OF COLLECTION IN A NUMBER OF AMERICAN CITIES.

City.	Population, Census of 1900.	Year to which data refer.	Amount Collected.	Cost of Collection.
Charleston	55,807	1898	17,428 tons	$6,152 00
Chicago	1,698,575	1899	1,189,970 cu. yds.	299,657 91
Elizabeth	52,130	1899	25,000 cu. yds.	5,000 00
Hoboken	59,364	1900	.....	4,000 00
Jersey City	206,433	1900	.....	20,000 00
Knoxville	32,637	1900	17,000 cu. yds.	4,000 00
Louisville	204,731	1899	86,380 tons	40,086 00
Newark	246,070	1898	325,000 cu. yds.	61,000 00
Orange	24,141	1899	3,000 tons	3,500 00
Passaic	27,777	1899	18,750 cu. yds.	3,000 00
Perth Amboy	17,699	1899	.....	2,300 00
Troy	60,651	1899	32,850 tons	25,000 00

Disposal of Mixed Refuse.

Dumping. By far the commonest method of disposing of mixed wastes is by dumping on low lands. That such a method of disposal creates a nuisance goes without saying. It usually gives rise to many complaints and is rarely satisfactory, but is merely tolerated because of its economy. If land which needs filling is to be found within easy hauling distance it is by far the cheapest method of disposal. The cost of hauling is the only cost, and this would not usually be greater than for some other method. Generally nothing is paid for the privilege and no income is derived from it though occasionally, especially in some of the larger cities, some of the cleanest ashes are sold for filling. Sometimes one or more men are kept on the dump to superintend it. The following cities dispose of their mixed refuse in this way: Augusta, Ga., Bayonne, N. J., Charleston, Chicago, Duluth, Elizabeth, Jersey City,

[1] Charleston. Street Department, city employees.
Chicago. Street Cleaning Department, city employees.
Elizabeth. Health Department, contract.
Hoboken. City Council, contract.
Jersey City. Street Commissioners, contract.
Louisville (previous to 1901). Department of Public Works, city employees.
Newark. Department of Public Works, contract.
Passaic City. Health Department, contract.
Perth Amboy. Health Department, contract.
Troy. Contracting Board, contract.

Long Island City, Louisville, Meriden, Conn., Mobile, Newark, Passaic City, N. J., Perth Amboy, N. J., Orange, N. J., Raleigh, Tacoma (in part), Williamsport, Pa., and Wilmington, N. C.

In Providence a large public dump is cared for and kept level by a contractor, who as compensation has the refuse he can recover from it.

Dumping in Water. In Memphis until 1898 the mixed garbage was dumped in the Mississippi river about one mile below the city. In New Orleans it was formerly dumped into the Mississippi and caused no trouble or offence, but it was forbidden by the Federal government as it was considered likely to injure navigation. In Tampa the mixed garbage is dumped into the bay about two miles from land and the method was reported satisfactory in 1896. In Tacoma a part of the refuse is deposited in Puget Sound and in New York, Boston and Lynn a part is towed out and dumped into the ocean.

Cremation. In Augusta, Ga., Galveston and Macon, parts of the garbage and dry refuse are separated from the ashes on the dumps and are burned together in the open air. In the first two cities the method is said to be satisfactory, but in Galveston not.

In Troy a part of the mixed wastes, the most offensive part, is cremated in a Brown crematory. In this city the contractor uses as much of the refuse as he can for filling an island in the river, and the most offensive he dumps into the crematory and burns it twice each week.

In San Francisco all the mixed refuse is treated in a Thackery crematory. This crematory was built by a private corporation which has a fifty years' franchise. In San Francisco the refuse is collected by private scavengers who are obliged to deliver it to the crematory and pay twenty cents per ton for its destruction. They in turn collect this from the householder. The manager of the works states that about 90,000 loads of one ton or three cubic yards each are collected annually.

The crematory consists of a series of cells or furnaces just alike, into which the refuse is discharged through a hopper. All these cells communicate with a very high chimney. After the fire is once started no fuel is used as there is enough combustible material in the refuse to consume the garbage. The only expense is labor and repairs. A large amount of ash results, from eighty-five to ninety per cent., and the works must be located where that can be easily disposed of for filling. The works in San Francisco are said to have cost $200,000, and on a six days' test the cost is said to have been 15¾ cents per ton. The crematory was built by the Thackery Incinerating and Fertilizing Company of San Francisco.

Night Soil.

Night soil is usually understood to mean the human excrement contained in privy vaults and also the liquid house wastes received in cesspools, whether such wastes come from water-closets or kitchen sinks. Sometimes, however, the contents of cesspools is spoken of as "cesspool matter" or "cesspool water." It is not nearly so offensive as true night soil from privy vaults, and its value as a fertilizer is far less.

The only true solution of the night-soil problem is to do away with vaults and cesspools, by utilizing city sewers to carry off all such wastes; but in all cities there will be unsewered areas in the suburbs where vaults or at least cesspools are a necessity, and many cities are as yet imperfectly sewered, even in their thickly settled portions, and others still, while endeavoring to abolish vaults have made only little progress, so that the question of how best to remove and dispose of night soil is still an important one.

Licenses.

The persons who engage in the business of collecting refuse of all kinds are called scavengers, though this name is perhaps most closely associated with the business of removing night soil. The work of scavengers is regulated in most cities by ordinances, and the first step in such regulations is the licensing of the persons who engage in the business. The power to license scavengers and otherwise to regulate the cleaning of vaults is undoubtedly contained in any broad grant of sanitary power as was shown by a decision in Maryland,[1] and it is usually exercised by virtue of such. Nevertheless, special legislation is sometimes found on this, as on almost all other sanitary subjects. Thus in New Jersey[2] the board of health in incorporated municipalities is empowered to make rules "for the purpose of regulating the business of emptying privy vaults, sinks, and cesspools in any municipality." Similar provisions are found in Colorado,[3] Ohio,[4] and Rhode Island.[5]

There are very few cities which do not require a license for a person to engage in the business of removing night soil, and they of course, usually forbid the cleansing of any vault or cesspool except by a licensed scavenger.[6] As shown in this rule, the owners of property may be per-

[1] Boehm *vs.* Baltimore, 61 Md., 259.

[2] New Jersey, Chapter 102 of 1898, Sec. 1.

[3] Colorado, Act of 13 April, 1893, Sec. 7.

[4] Ohio, Annotated Statutes (1900), Sec. 2616.

[5] Rhode Island, General Laws (1896), Chapter 92, Sec 21.

[6] Providence, Rules of Board of Aldermen (1899), Chapter 1, Sec. 45:

"No person shall engage in the business of removing the contents of privy vaults and cesspools, or shall remove the contents of privy vaults or cesspools, with-

mitted to remove the contents of the vaults and cesspools owned by them. In some cities, as in Hartford, the owner of a vault is never allowed to empty it.

In a number of cities, as Denver, Jersey City, Rochester, Pennsylvania cities of the first and second class, the person who desires a license must make a written application. See Appendix 116. In Rochester the licensee must be a resident of the county. In Philadelphia he must be of good character and must not only have suitable apparatus, but must keep it under cover and out of view when not in use. The license must be duly recorded, and as is the case with all other licenses and permits, it is best recorded on a stub.

In most cities the license is issued by the board of health, though sometimes by the clerk or health officer, but in Chicago and Denver it is issued by the mayor. Sometimes no charge is made for a license, as in Detroit. Usually there is a fee for the license, in many cases, however, a nominal one, as fifty cents in Meadville, Pa., or $1 in Providence. In Charleston, Baltimore, and Hartford it is $2; in Chicago, $5; in Milwaukee, Mobile, and New Haven, $10; in Paterson, $15 for each wagon; in Jersey City, $20; in Minneapolis, Reading, and Scranton, $25; in Buffalo, Denver, Philadelphia, and Ottumwa, Ia., $50 for each wagon.

The licensee is often required to give bond for faithful compliance with the rules. In Mobile it is $100, in Chicago and Denver $500. In almost every city the license must be renewed annually, but in Boston and Haverhill it is given for three years. Often the privilege of revoking the license for cause is reserved by the licensing power, and this is especially authorized by the act establishing the bureau of health in Pennsylvania cities of the second class.[1] In Denver the scavengers are required to wear badges which are furnished by the health commissioner and paid for by the scavenger and the money refunded when the badge is returned.

Apparatus.

The most primitive method of removing and disposing of night soil, is for the owner of the vault or the occupant of the premises to dip out its contents and spade it into the soil of the yard or garden. This is not a bad method in the country or for the more isolated dwellings of villages, or the suburbs of cities, and is occasionally and under proper

out first obtaining a license of the board of aldermen; but nothing in this section shall be construed as forbidding any person the owner of a privy vault or of a cesspool from removing the contents therefrom, provided a permit be first obtained from the superintendent of health."

[1] Pennsylvania, Chapter 258 of 1895.

restrictions permitted even in cities of a considerable size. In such cases such a simple procedure is not desirable, and as has been stated in most cities, there are persons who make a business of removing night soil, and such persons are licensed and their method of doing the work regulated.

Almost without exception the regulations prescribe that the receptacle to be used for conveying night soil shall be tight or air-tight, usually the latter. This was in former times about the only regulation, and under it it was permissible to use large box wagons for this business. The night soil was baled out of the vault in a long-handled dipper, and the more solid portions shoveled out and carried in a large pail and poured into an opening in the top of the box which remained standing in the wagon in the street. The use of boxes is considered very unsatisfactory and is now permitted in only a very few cities, as Bridgeport, Chicago, Minneapolis, New Haven, Ottumwa, Ia., Salem, and St. Paul.

The next improvement was the introduction of tubs or barrels which could be carried or rolled to the vault or cesspool and into which the night soil could be directly dipped with a bucket. Such are used exclusively in Atlanta, Cleveland, Hartford, New Bedford, Newport, R. I., Portland, Providence, and Syracuse, and in almost all cities there are some vaults in which the contents are too solid to be pumped, and in such cases barrels or tubs must necessarily be used.

FIG. 99.

Night soil Tub used in Providence. Costs $3.50, and holds 3½ cubic feet.

FIG. 100.

Night-soil Barrel made by Odorless Excavating Co., 64 Federal Street, Boston.

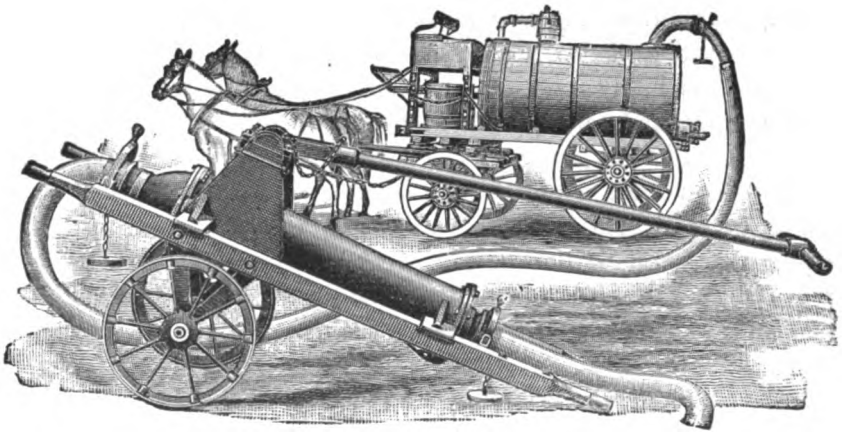

FIG. 101.

Pump and Tank Wagon made by the Odorless Excavating Co., 64 Federal Street, Boston. This apparatus is used in Boston, Cambridge, Brookline, Newton, Somerville, Quincy, and other Massachusetts cities and towns.

In Atlanta two sets of barrels are used. The full set is left at the dump and a clean set put on the wagon. In Syracuse the barrels must be carried in a covered box wagon.

Nearly all cities now require the use of the so-called odorless or pneumatic apparatus, though sometimes, as in Camden, it is only required during the summer. The odorless method consists in the use of a pump and a hose and tank wagon. The suction from the pump is placed in the vault or cesspool and the outlet is attached to the tank and and the night soil is pumped into the tank without being exposed to the air. As the night soil is forced into the tank, the air of the tank which is of course offensive, is forced out, and sometimes is made to pass through a small charcoal fire or through some deodorizer.

Sometimes instead of the tank wagon barrels are used to which the hose can be screwed. Their use is very common in the District of Columbia, Fall River, Baltimore, Asbury Park, and Camden.

With cesspools of course the contents can be readily and completely removed by means of the pump, but in the case of vaults there is almost always some solid refuse or some extraneous substances, as tin cans and the like, which cannot be pumped. As has been shown in a previous chapter, it is often made an offence to put such substances in a privy vault, and in Fall River the following effectual method is taken to secure the enforcement of the law:[1]

"When a vault, privy or cesspool, shall be found to contain an excessive amount of tins, crockery or other rubbish, the health agent or inspector shall report the same to the board, and a fine of two dollars may thereupon be imposed at the discretion of the board upon the owner of said property, and the proceeds thereof shall be equally divided between the board and the scavenger cleaning said receptacle."

Even when all such matter is excluded from vaults, a considerable part of the contents and perhaps the whole contents may be solid unless the vault is absolutely water-tight. Many vaults intended to be water-tight are not so, and very many are built so as to permit the fluid contents to leach away, so that it is often impossible to remove the entire contents with a pump. Sometimes, as in Woonsocket, R. I., water is pumped into the "dry vaults" beforehand to facilitate the pumping the next day; but in any event it happens that something is left behind by the pump which has to be removed with a shovel. To render such removal as inoffensive as possible, the pitting outfit was devised.

This consists of a sort of tent set up over the opening into the vault and provided with a ventilator leading to a deodorizer. The use of this is required by rule in Baltimore, Newark, New Orleans, Haverhill, and

[1] Fall River, Regulation of Board of Health (1894), Sec. 58.

Philadelphia, but as a matter of fact it is seldom used in any of these cities.

In Portland, Me., night soil is removed by the old fashioned dipping process and screens are required around the vault.

Among the most complete rules for apparatus for removing night soil are those found in Philadelphia. See Appendix 117. It is almost always required that the apparatus shall be kept well painted, sometimes of a distinctive color, and shall have upon it the name of the licensee and the number of the license, and the height of the letters or figures is often specified, and varies from two to six inches. In Providence "all apparatus must have the name of the licensee upon it in plain letters,"[1] which is interpreted as requiring the name upon every tub, barrel, and wagon. The capacity of the wagon in cubic feet must also be marked upon it in many cities. In a number of cities where night soil is removed at night, as Chicago, Jersey City, Milwaukee, Mobile, and Rochester, it is required that the scavenger's wagon shall be provided with lamps. The Chicago rule is given below.[2]

Wagons and Apparatus Must be Kept Clean.

"The entire apparatus and appliances shall at all times present a clean appearance, be free from obnoxious odors, and always in good and efficient working order. The workmen shall be well instructed in their duties, and orderly while in the performance of their work."[3]

In Jersey City, Minneapolis, Cincinnati, and some other cities it is required that the wagons must be washed. In Cincinnati "all carts, tanks, and vessels used for the purpose must be water-tight and the same must be thoroughly washed and disinfected immediately after being emptied."[4]

The rule given below, originally enacted in the sanitary code of New York, has been quite generally copied by other cities.[5] In Wil-

[1] Providence, Rules of Board of Aldermen (1899), Chapter 1, Sec. 48.

[2] Chicago, Ordinances (1881), Sec. 1870:

"Scavengers who engage in the business of removing the contents of privy vaults at night, shall cause to be painted upon the wagon box of their wagons, in letters and figures, their names and the number of their licenses, together with a lighted lamp with plain glass fronts and sides, with the number of the license of such wagon painted with black paint on the sides and front of each of said lamps, in distinct and legible figures at least two inches in size, and so placed that said lamps may be distinctly seen, and said number easily read."

[3] Philadelphia, Rules of Health Department (1895), Sec. 224.

[4] Cincinnati, Manual of Health Department (1898), p. 41.

[5] New York City, Sanitary Code (1899), Sec. 124:

"That no cart or other vehicle for carrying any offal, swill, garbage, or rubbish, or the contents of any privy, vault, cesspool, or sink, or having upon it or in anything on such cart, any manure, or other nauseous or offensive substance, shall,

mington, Del., the carts "when not in use must be kept under cover and from public view." In Milwaukee scavengers' wagons must be kept outside the city unless they are "rendered inodorous by the use of carbolic acid or some other equally efficient deodorizer, and kept in a tight barn or building." In Lowell scavengers must "avoid as far as possible travelling in the principal streets when crowded."

In very many cities it is required that the apparatus be inspected by the proper officers before the license is granted. Besides the preliminary inspection and approval, it is necessary for the apparatus to be inspected every three months in New Bedford, and every month in Cincinnati, Jersey City, Minneapolis, and Wilmington, Del.

Methods of Removal.

In most cities the removal of night soil is left to private enterprise. All the city attempts to do is to control the work by license and inspection, and perhaps by fixing a maximum price for which the work shall be done. The following are some of the prices fixed by ordinance or board of health regulations:

Price per Cubic Yard.		
$5.40	Newburgh.	If over 75 cubic feet the charge is $4.
4.00	Milwaukee.	
	Minneapolis.	Fixed by agreement of scavengers.
	Denver.	
	District of Columbia.	$3 for subsequent loads.
3.24	New York City.	
	Yonkers.	
	Philadelphia.	
	Spokane.	
3.00	Buffalo.	
	Chicago.	
	Mobile.	
2.70	Elmira, N. Y.	If over 100 cubic feet, $2.16; over 150 cubic feet, $1.35.
	Fitchburg.	If less than 20 cubic feet the minimum is $2.
	Ottumwa, Ia.	If work is done by day, $2.16.
	St. Paul.	The minimum is $2.
	Wilmington, Del.	
2.43	Warren, O.	

without necessity therefor, stand or remain, nor shall a needless number gather before or near any building, place of business, or other premises where any person may be; nor shall any such cart or vehicle occupy an unreasonable length of time in loading or unloading, or in passing along any street or through any inhabited place or ground; nor shall any such cart or vehicle, or the driver thereof, or anything thereto appertaining be (or by any person having a right to control the same, be allowed to be), in a condition needlessly filthy or offensive; and when not in use, all such carts, vehicles, and all implements used in connection therewith, shall be stored and kept in some place where no needless offense shall be given to any of the people of said city."

Price per Cubic Yard.		
$2.00	Boston.	Over 240 cubic feet, $1.55.
	Holyoke.	If over 80 cubic feet, $1.65; over 120 cubic feet, $1.50.
1.90	Cleveland.	
1.65	Grand Rapids.	
1.45	Manchester.	
1.35	Lowell.	Barrels with solid matter are 20 cents each, and the minimum charge for all work is $3.
	Providence.	
	Somerville.	

In New Bedford the price is $2 for a load of twelve tubs, and in Hartford $2 for ten tubs; in Newton, Mass., $3 per load, but the size of the tubs and loads is not given; in Manchester $3.50 per load of twelve barrels. In Florence, N. C., fifteen cents per month is charged for every privy and the work is done by the city.

It is possible to exercise a better control over the business if a license is issued to only one party, and that is the method pursued in Boston, Cleveland, District of Columbia, Hartford, Haverhill, Newton, Mass., Portland, Me., Richmond, Va., Somerville, Mass., Springfield, Mass., and Warren, O. In Pittsburgh there are two licensees. This license, or contract as it is often called, is usually for one year, but in some of the Massachusetts cities it is for three years. The form of the last contract in Boston may be found on page 93 of the report of the board of health for 1898.

Whether or not there is one licensee or many, the city often assists and controls the work through its own employees. Thus orders for work are frequently received by the city at police stations, as in Cambridge; or at the board of health, as in Boston and Cincinnati, and either sent to the contractor or called for by him. This is to facilitate work and assist the citizens rather than the licensee. A different plan is pursued in Warren, O.:[1]

"The owner of a closet desiring the same cleaned, applies to the sanitary office, where, in a book for that purpose, is kept a record of the drawers and dimensions of all vaults in the city. The sanitary policeman gives the owner a check or slip from a stub-book of blanks, whereon is stated the name, street and number, the amount in vault or drawer, as the case may be, and the amount of money to be paid. The holder takes this check or slip to the bank, pays the amount required, the bank stamps the slip "paid," and drops it in a board of health metallic safety-box, with Yale lock—similar to government letter-box, only smaller—fastened in the bank or some convenient place. The contractor, who has a key to this box, goes to it and gets the slip. This slip indicates to him his order for work, and place where, and also the important fact that the cost of said work is deposited in the bank. At the end of each month the president of the board of health gives the contractor, in exchange for the month's slips, a check on said bank for the amount."

[1] Paper read by William T. Fee of Warren at a meeting of Local Boards of Health of Ohio, Columbus, 1895.

In Cleveland the owner calls at the health department and makes his payment in advance, which can well be done, for all vaults in that city are of standard size, and the health officer sends the contractor to do the work, and an inspector to see that it is done. One clerk is detailed to look after this part of the office work.

The nature of this business is such that employers do not care to give the work much attention, and hence are liable to be imposed on in some instances, and in others to imagine that they are imposed upon. The city occasionally steps in to help settle the dispute. In Cambridge:[1]

"For the purpose of allowing the property owners an opportunity of ascertaining the quantity taken from any privy vault or cesspool any police officer is authorized to detain for not more than thirty minutes any wagon or tank used for removing the contents of privy vaults or cesspools."

In Yonkers, N. Y., "No scavenger shall be entitled to receive compensation for such services until his verified account therefor has been approved and certified to by the health officer."[2] See Appendix 11. In Boston:

"Said board of health on complaint of a person charged for such work may cause the work to be measured, and if it measures less than reported by said company, said company shall pay the cost of measurement, and the charge shall be abated accordingly."[3]

In Philadelphia where a large number of orders (2,095 in 1896) are issued by the board of health to remove the contents of privy vaults the rules given below are in force.[4]

[1] Cambridge, Rules of Board of Health (1897), Sec. 27.

[2] Yonkers, Sanitary Code (1897), Sec. 30.

[3] Contract with Odorless Excavating Company, Boston, Board of Health Report (1896), p. 94.

[4] Philadelphia, Rules of Board of Health (1895), Sec. 137:

"The measurers shall, under the direction of the health officer, measure all wells cleaned by order of the board, and shall furnish said officer with a duplicate copy of an account of the measurement. If the cost of cleaning said wells exceeds the sum of twenty dollars, they shall receive as compensation therefor a sum equal to six per cent. of the amount of the bills. In all other cases the sum of one dollar only shall be paid equally by the cleaners and the owners of the property from whence the nuisances are removed. They shall not grant a certificate of measurement until the rule of the board "requiring the entire contents of the well to be removed," has been complied with, unless otherwise ordered by the board.

"They shall refuse a certificate of measurement, unless furnished with the original order and permit to clean said well.

"They shall present the health officer with the certificate of measurement, accompanied by the original order and permit for cleaning said well, within forty-eight hours after the receipt of the order from the cleaner."

Two measurers are appointed by the board of health for this purpose. They are also obliged to report all violations of rules. Of 2,207 inspections in 1895 they reported only three violations. In Denver the scavenger is required to give a receipt to the owner of the vault.

A few cities proceed one step further and provide for the municipal removal of night soil, though this has never been as popular as the municipal collection of garbage and dry refuse. It is the plan pursued in Atlanta, Brockton, Florence, N. C., Lawrence, Lynn, Macon, Mansfield, O., Rochester, Salem, Mass., and Youngstown, O.[1]

Frequency of Cleaning.

On page 186 were given regulations in regard to the minimum distance from the top of the privy vault which the contents might be permitted to reach. As regards the time limit, quite a number of cities require that privy vaults shall be cleaned annually. In Asbury Park, which is chiefly a summer city, they must be cleaned between 1 November and 1 June. In Florence, N. C., where dry closets are in use they are cleaned by the city each month. In Atlanta the health department cleans the privy vaults once each week.

There are very few regulations as to the frequency of cesspool cleaning.

Hours for Cleaning Vaults and Cesspools.

As its name implies, night soil was at one time usually removed at night because it was thought that if the owner of the premises was asleep the offensive odors created by the crude apparatus formerly employed would not be noticed. As a matter of fact the owner was usually awakened by the noise if not by the odor, and the nuisance was then felt to be more intolerable than in the day time. Moreover, it is not as easy to do the work well at night, or as economical, nor is it as easy to supervise it. So the work of removing night soil has in many cities gradually been transferred to the day time. Nevertheless, the regulations in a considerable number of cities still require that night

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[1] List of cities showing amount of night soil removed by municipal collection:

Year.	City.	Amount.
1899.	Atlanta,	9,949 loads or 7,936 tons of night soil.
1898.	Brockton,	2,699 loads of night soil.
		4,737 loads of cesspool matter.
1899.	Lawrence,	615 loads of night soil.
		4,723 loads of cesspool matter.
1899.	Lynn,*	1,846 loads of night soil.
1899.	Salem,	966 loads of night soil.

*In Lynn the health department also cleanses catch basins with its night soil apparatus and charges it to the commissioners of drains.

returned to the health department. The method of loading is shown in the accompanying cut.

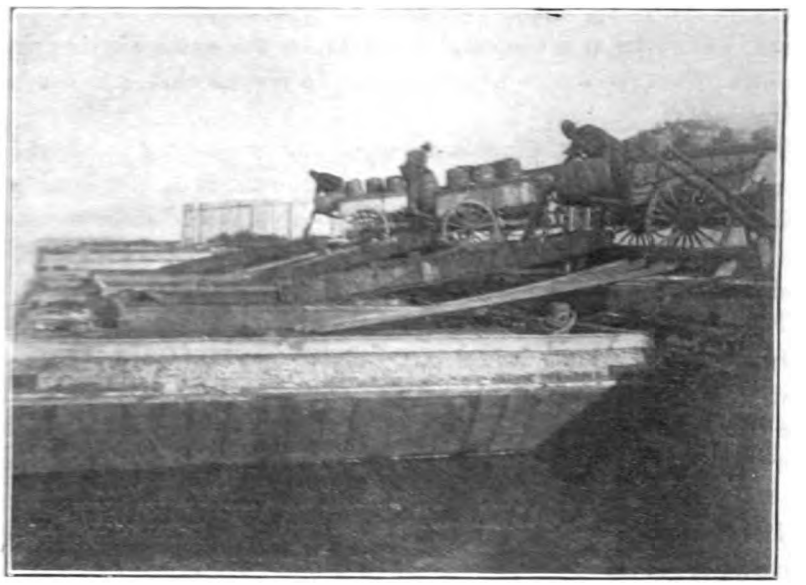

FIG. 102.

Method of loading Night Soil on Scows in Baltimore.

The scow is towed to an isolated spot seven miles down the river and the night soil is pumped out, steam from the towboat being used for the purpose. Two large depressions in the ground are used to receive the night soil, one being left to dry, while the other is being filled. When dry enough to handle, it is shoveled out onto a protected platform where it is further dried and finally sifted and sold as a fertilizer at about twenty dollars per ton.

Besides the making of night soil into a fertilizer, and its deposit on land where it mostly ultimately becomes plant-food, night soil is sometimes gotten rid of without any attempt at utilization. This is the case when night soil is deposited in rivers, lakes, or the ocean. The deposit of night soil in lakes or rivers which are used as a source of municipal supply is a most dangerous practice, and even if the waters are not put to such use, nuisance and offence are likely to be created. Among the cities which dispose of night soil in this way are Brooklyn, Cincinnati, Cleveland, Davenport, Dubuque, Lynn, Minneapolis, New Orleans, Pittsburgh, and St. Paul.

In Cleveland a large scow is kept moored at the lake front. It is built somewhat like a catamaran with a space for the night soil between

the two hulls. This is from time to time towed out into the lake and there deposited. It is supposed to be taken ten miles from the city but in bad weather in winter may not be towed so far. The city pays forty dollars per week for this disposal.

In Minneapolis and St. Paul the night soil wagons drive down to the bank of the Mississippi and discharge their contents into the river. In St. Paul it is discharged on to a shute which is kept clean with water from an eight-inch flowing well. In Cincinnati it was formerly deposited on a scow which was towed out into the river and there discharged its contents; but the federal government ordered this discontinued, so that it is now emptied into a sewer on the bank just before the sewer empties into the river. At Pittsburgh one of the scavengers has a float on the river onto which the teams can be driven and the contents of the wagons be dumped in the water. The owner of the float charges the others a small fee. Another scavenger has a tank scow which is towed down the river a short distance and there discharged.

Night soil contains so much water that it is rarely disposed of by cremation, though in several cities a portion at least is carried to the crematory. This is true of Atlanta, Camden, Dayton, Evansville, Findlay, O., Jacksonville, McKeesport, Pa., Muncie, and New Brighton. In Atlanta in 1898 there were cremated 2,362 loads of night soil. In Dayton during thirty days there were cremated 1,900 barrels containing 300 pounds to the barrel. During the year 1899 there were cremated in that city 6,754 barrels of night soil for which service the scavengers paid the city $1,350.80.

Grease, Bones, etc.

Waste grease of domestic production, commonly known as soap grease, is usually an offensive material as it accumulates slowly and is allowed to remain on the premises some time before sold to the "soap grease man." This soap grease is usually collected by itinerant dealers, who trade for it, using soap in exchange, or else pay cash, and who make their collections in hand carts or modest wagons. This business tends to give considerable offence from the slow transportation of the decomposing grease through the streets. Many cities attempt to regulate it by specific rules, and others control it through general rules, such as are referred to on page 154.

These regulations require that the collector shall be licensed and that the material shall be removed in tight covered receptacles. In many cities it is specified that the wagons shall not stand on the street

in one place any longer than necessary.[1] In Pennsylvania cities of the second class such wagons are allowed to stand in one place not longer than fifteen minutes, and in Cincinnati the time is five minutes. In the latter city closed vessels are required between 1 October and 1 May. In Denver grease can be collected only after sunset. In St. Louis soap grease may be stored only beyond one mile from the city.

Besides domestic grease, there is in all cities a large amount of market refuse consisting of tallow and bones, the latter having adherent a large amount of fat and some flesh. These materials are usually collected by parties who render them, and a considerable sum is paid the market men for them. They are often quite offensive, particularly if they are not collected daily in the summer time. Among the most explicit regulations of this business which the writer has seen are those of Lynn[2] and Camden.[3] In Lynn the wagons must be brought to the health department on the first of each month for inspection. The license fee is one dollar per month. In Camden the fee is $75 per year for each wagon.

A firm engaged in this business in several cities makes use of the form of wagon shown in the accompanying illustration and in the city of the writer it gave excellent satisfaction. This firm believes that it is for their interest to collect market refuse daily as it is then in better condition and the products obtained from it bring a better price.

[1] Fall River, Regulations of the Board of Health (1894), Sec. 13:

"No person shall allow any vehicle under his control, containing fat, bones, soap grease or any bad smelling substance to stand in any street, alley, lane or on any public grounds of the city, longer than is absolutely necessary for the purposes of loading and unloading."

[2] Lynn, Rules of the Board of Health:

"*First.* A license fee of one dollar per month for each and every wagon licensed shall be paid.

"*Second.* Vehicles and vessels used *exclusively* for the transportation of bones and tallow shall have a covering of canvas which shall completely cover the contents of the vehicles and vessels so used.

"*Third.* Vehicles used for the transportation of grease and other refuse matter shall have a covered top to the same, with flap on front and rear, which shall be kept down and fastened except when in actual use.

"*Fourth.* All vehicles and vessels used in the transportation of either bones, tallow, grease, or refuse matter, shall be kept in such condition as will prevent the escape of any of their contents, or the odor thereof, and entirely conceal the same from view.

"*Fifth.* Every vehicle so used shall have the name of the owner and number of the wagon in letters and figures of two inches in size painted thereon in some conspicuous position.

"*Sixth.* When the holder of this license discontinues the business for which it is granted he shall return it to this office.

"*Seventh.* Any violation of the above rules will cause a revocation of this license and subject the offender to prosecution."

[3] Camden, Ordinances, 28 July, 1890, and 26 June, 1893.

FIG 103.

Fat Wagon used by Schwarzschild & Sulzberger, of New York.

OLD JUNK, RAGS, AND BONES.

Among the various kinds of refuse or junk that are collected by peddlers, those most liable to cause offence are bones and rags. Junk bones differ from market bones, as the former are of domestic origin and have usually been cooked and freed from most of the adherent fat and meat. Such rags and bones are not usually offensive enough to need covering during transportation through the streets, and though the collectors are usually licensed, it is by the police rather than by the sanitary department. The storage of this form of junk may, however, give rise to nuisance, and regulations in regard to it are found in many cities. Sometimes a permit for storage is required. It is sometimes forbidden to store such junk in dwelling houses, as in Cambridge, Lowell, and Lynn. In Jersey City rags and bones must not be kept within twenty feet of a dwelling. A more stringent rule is found in the District of Columbia.[1]

[1] District of Columbia, Webb's Digest:

"SEC. 2 (page 44). It shall be unlawful for any person to store, put, or place bones which shall have been purchased or bartered in any house, storeroom, stable, building, or place, within two hundred feet of any dwelling house, other than the dwelling house of the person storing such bones, under a penalty of five dollars for each and every day that the same shall be stored, put, or placed as aforesaid; and it shall be unlawful for any person or persons to store old rags which shall have been

Dead Animals.

Dead animals are of two classes, the smaller animals, as dogs, cats, rats, hens, etc., which are altogether worthless, and the larger animals, as horses, cattle, and swine, which are of value for their grease, hides, and for fertilizer.

In regard to the smaller animals there is oftentimes no very efficient means of getting rid of them, and it is no uncommon thing in many cities to see them lying for days in yards and vacant lots, in ponds and streams, and in the streets. In some cities, as Atlanta, Buffalo, Cleveland, Detroit, Houston, Tex., Lawrence, St. Louis, and St. Paul, the garbage men are required to remove small dead animals if placed with the garbage. In cities like Omaha, where the licensed garbage collector receives his pay from the householder, the price for such removal is fixed by ordinance. In Omaha it is seventy-five cents for each dog, and twenty-five cents for each cat. If small animals are found on the street it is usually the duty of the street cleaning department to remove them, but in Philadelphia the garbage contractor performs this duty, and in the City of New York the health department. In Denver a special contractor collects and disposes of all dead animals for $1,500 per annum. In Nashville they are collected by the board of public works. In Mobile there is a special contractor who is paid by the city, but the owner of the animal must pay if he can be found. In Richmond also there is a special contractor. In a number of cities it is customary for citizens to report dead animals to the police, and for the scavenger to call at the station for orders.

If such dead animals are on private property the health department may properly order the owner to dispose of them. In Providence this is usually done if the private property is enclosed like a yard or area; but in the case of open lots, private alleys, and streams and ponds the carcass is removed at the expense of the city. A considerable nuisance is thus promptly abated at a small expense.

The larger animals usually have a considerable value. In most cities one or more parties are found who remove such when notified by citizens, police, or sanitary officers. Usually this is done without cost, but sometimes a small charge is made, and in other cases a small sum,

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purchased or bartered in any house, storeroom, stable, building, or place, within fifty feet of any dwelling house, other than the dwelling house of the person storing such rags, and the entire stock of old rags, so collected and stored, shall be removed from the premises or shipped at least once in every fifteen days; and any person or persons storing old rags, or refusing or neglecting to remove the same in accordance with these provisions, shall be liable to a fine of five dollars for every day that they shall so offend."

as one or two dollars, is paid. In St. Louis they *must* be delivered to the garbage contractor.

Lest dead animals should be allowed to remain in the streets, it is sometimes required that the fact of the body so lying shall be at once reported to the city officer.[1] In Cleveland the report must be made within eight hours.

While provision is thus made by private or public effort for the proper disposition of dead animals, the improper disposition is usually forbidden. The disposal of dead animals by throwing into public waters is most objectionable, and this is often prohibited by laws designed to prevent the pollution of rivers or to protect public water supplies. Most of the legislation specifically relating to the disposal of dead animals is local, but some of it is statutory, as in Georgia, Maine,[2] Missouri, and Vermont. The Georgia Law[3] applies only to counties containing cities of 60,000 inhabitants, and requires that dead animals shall be buried or made into a fertilizer within three hours.

Most of the local regulations forbid the improper disposition of dead animals, and many of them follow the type of that of the City of New York.[4] The rules also go further and prescribe what shall be done with the carcass.[5]

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[1] New York, Sanitary Code (1899), Sec. 140:

"That it shall be the duty of the owner, and of the person that last had or then having charge of any animal, so dead or injured or diseased, and being in any street or public place, to at once give notice thereof, and of the nearest street and avenue where it may be, to some inspector or officer of this department, or of the sanitary bureau, unless such animal is at once removed by some proper person."

[2] Maine, Chapter 39 of 1899:

"Whoever personally or through the agency of another leaves or deposits the carcass of a dead horse, cow, sheep, hog or any other of the larger domestic animals in any place where it may cause a nuisance shall, upon receiving a notice to that effect from the local board of health, promptly remove, bury, or otherwise dispose of the remains, and if he fails to do so within such time as may be prescribed by the local board of health, and in such manner as may be satisfactory to such board of health, shall be guilty of a misdemeanor, and shall be punished by a fine of not less than five nor more than twenty-five dollars, or by imprisonment not exceeding one month."

[3] Georgia, Chapter 143 of 1895.

[4] New York, Sanitary Code (1899), Sec. 137:

"That no person shall leave in or throw into any place or street, or public water, nor offensively expose or bury, the body (or any part thereof) of any dead or fatally sick or injured animal; nor shall any person keep any dead animal or any offensive meat, bird, fowl, or fish in a place where the same may be dangerous to the life or detrimental to the health of any person."

[5] New York, Sanitary Code (1899), Sec. 139:

"That any person having a dead animal or an animal past recovery, and not killed for and proper for use as meat or fish, or in any offensive condition, or sick with an infectious or contagious disease on his premises in said city, and every

In a number of cities dead animals are consumed in the crematory. This is reported to be the case in Atlanta, Ga., Columbus, Ind., Evansville, Jacksonville, Lowell, Somerville, Mass., Mount Vernon, Ind., New Brighton, Portland, Ore., Richmond, Salt Lake City, Savannah, Trenton, Yonkers, and Wilmington, Del. It is, however, likely that in most of these cities the larger and more valuable animals are not so treated, but are utilized. Indeed it would not be easy to get a whole horse into the opening of an ordinary crematory. In Atlanta it is expressly stated[1] that few large animals are so disposed of, but in 1898 there were cremated 2,992 dogs. In Columbus in 1899 there were cremated 2,366 dead animals.

When there are reduction works for the disposal of garbage dead animals are usually taken to them as they furnish good fertilizer material.

The most common method of disposing of the larger dead animals is by skinning in order to save the hide, and rendering the rest of the body. In nearly all the larger cities there are parties engaged in this business, but in smaller places where there are not enough animals to warrant the establishment of such a business, the animals have to be buried. The regulations governing rendering have been considered in another place.

It is sometimes prescribed, and even when it is not the law, it is often the custom to remove dead animals in covered vehicles.[2]

person whose animal or any animal in his charge or under his control in any street or place, may die or become or be in a condition past recovery, shall at once remove or cause the removal of such animal, dead or alive, to some proper place, and when such place may be designated by the sanitary superintendent of this department, to the place so designated."

[1] Atlanta, Board of Health Report (1898), p. 29.

[2] District of Columbia, Police Regulations (1896), Art. 8, Sec. 24:

"No dead animal of the horse, mule or jack kind, and no dead cow, goat, calf, sheep, dog or swine, or any part of the aforesaid dead animals, shall be transported through any street, avenue, alley, or public space within the City of Washington, or the more densely populated suburbs of said city, unless the same shall be conveyed in vehicles substantially air tight, constructed either of wood or metal, or both; nor shall any such dead animal or part thereof be deposited or left upon any wharf,

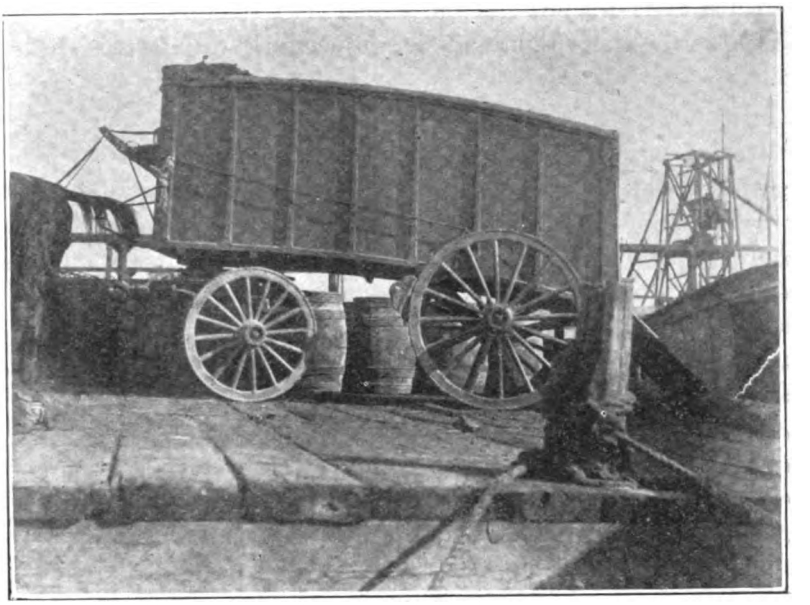

FIG. 104.

Wagon used in the District of Columbia for Dead Horses.

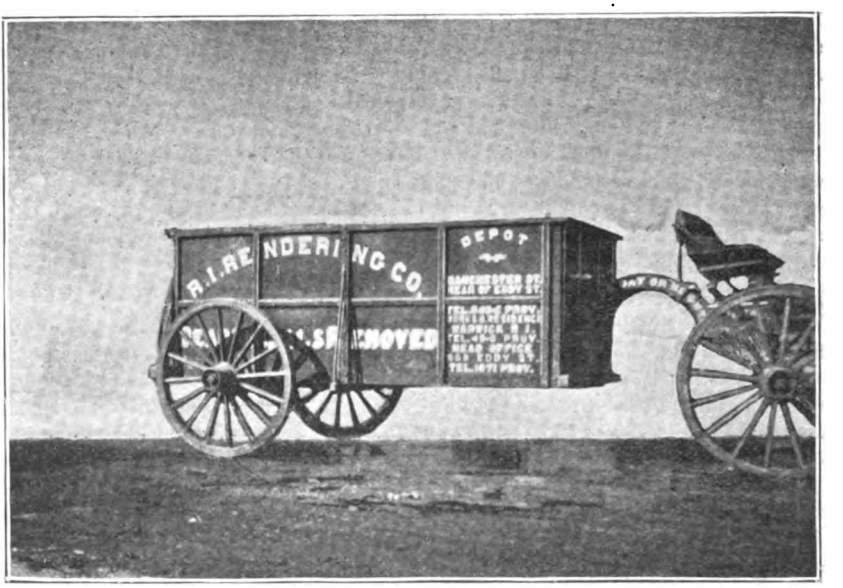

FIG. 105.

Deadhorse Wagon used in Providence.

In Pennsylvania cities of the second class steel boxes must be used which must be water tight and be washed and disinfected after each trip.

Other Offensive Substances.

Besides regulations specifically prescribing the manner of removal of garbage, ashes, night soil, soap grease, etc., a number of cities have other regulations applying to offensive matters in general or else include in night soil and garbage regulations general phrases intended to include all kinds of offensive substances. Such general regulations almost always require that offensive substances must be removed in tight covered vehicles or vessels, that the work must be done in a cleanly manner, and that a license or permit be required therefor. The rules from Cleveland are a good example of such regulations.[1]

A type of regulation governing the manner of collection and removal, taken from the sanitary code of the City of New York, is given on page 747. See also the Chicago rules on page 692.

Street Cleaning.

The cleaning of the city streets is usually in charge of the board of public works, the street commissioners, or a special department. Sometimes, however, it is made a part of the duties of the health department. This is true of Atlanta, Augusta, Ga., Memphis, Raleigh, and Richmond. In Denver the health department removes refuse from alleys while the street department cleanses the streets.

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street, avenue, alley or public place within said city; and in all cases where such animal or part thereof is transported upon the Potomac river or the Eastern branch, it shall be unloaded from the aforesaid vehicle directly into a scow provided for the purpose, covered and closed therein, and thereupon immediately conveyed beyond the District of Columbia, or to such place within the said district as may be designated by the health officer, and there so disposed of as, in the judgment of the health officer, not to be injurious to health, nor offensive to sight or smell. *Provided*, That this section shall not apply to the transportation of animals intended to be used for food."

[1] Cleveland, Revised Ordinances (1892), Chapter 30:

"Sec. 493. No person shall transport night soil, swill, garbage, fat, bones, offal, or any decayed or putrid or stinking animal or vegetable matter through any of the streets, lanes, alleys, avenues or other public grounds of the city, except by written permit of the director of police or health officer, and the same shall be transported in vehicles or barrels that shall be effectually covered and water-tight, so that no odors or liquids shall escape.

"Sec. 532. No person shall sell, barter, or give away, or cause to be sold, bartered, or given away, by agent or otherwise, any house offal, slaughter house offal, or any filth, or any refuse substances from any slaughter house, dwelling house or other place in the city, or the carcass of any dead animal, or part thereof, not killed for human food, unless the person or persons so buying or receiving the same shall have a written permit from the director of police or health officer to remove or carry the same in or through the streets, avenues, squares, courts, lanes, alleys, or places of the city."

CHAPTER XIV.

MISCELLANEOUS SANITARY WORK.

Communicable Diseases of Animals.

THIS is a subject that receives far more attention from the stock raiser, the business man, and the economist, than it does from the sanitarian. Vast numbers of animals die every year from diseases which are not communicable to man, and the death of these animals entails pecuniary losses which mount into the millions. Diseases such as pleuro-pneumonia, Texas fever, hog cholera, and sheep scab are not directly dangerous to man, and it is to the prevention or eradication of such diseases that the attention of law makers has been chiefly directed. The subject matter of the great body of laws relating to the diseases of animals, and most of the executive work of boards of cattle commissioners concerns diseases which can only indirectly affect human health, and hence are of no special interest to sanitary officials. Other diseases which fortunately are much rarer among animals are sometimes transmitted to man, and hence their control both in animals and man properly comes under our consideration. Such diseases are glanders, rabies, anthrax, actinimycosis and tuberculosis. How often the latter is transmitted from animals to man is still a disputed question, but all must admit that the probability of its being so transmitted is sufficient to warrant health officers in taking the liveliest interest in the methods which are taken for the eradication of the disease in animals. It is these diseases which are common to men and animals which it is proposed to consider, and the laws and administrative methods which can be made to apply to them. The federal, state, and local governments have all made efforts to control communicable animal disease. The bureau of animal industry in the department of agriculture has power to make regulations to prevent the spread of these diseases and it has made such rules and also enforced them, sometimes with great success, as in the case of pleuro-pneumonia and Texas cattle fever; but this department, engaged as it ostensibly is in the interests of foreign and interstate commerce, has given comparatively little attention to the diseases that are here under consideration. The state governments have very generally interested themselves in the checking of glanders, rabies, and

particularly tuberculosis, and have done much work in the attempt to control them, and some of our cities have done still more.

Legislation concerning communicable disease of animals may be found in almost every state and territory and in not a few cities. The regulations of the latter are usually adopted by local boards of health under their general grant of power, but sometimes as in Massachusetts,[1] "the board of health of cities and towns may take all measures necessary or expedient to suppress or prevent the spread or introduction of communicable disease among animals . . . and may make regulations in writing for the purpose named." Similar powers are specifically granted to town councils in Rhode Island and local boards of health in Minnesota. Statute law relating to this subject may be found in the annual reports of the bureau of animal industry. The items included in such legislation so far as it concerns our subject are not very numerous.

Importation of Disease. It is of course of the utmost importance to prevent the introduction of a communicable disease into a country, a state, or any smaller sub-division which is free from it. So far as the whole country is concerned the secretary of agriculture is authorized to make quarantine regulations for the control of foreign importations, and he has done so, and they are enforced by the bureau of animal industry as is shown in its reports. A large number of states also forbid the importation of animals sick with communicable disease or which have been exposed to such disease, and some cities do the same. Most of these laws and regulations forbid the importation of communicable disease without further specification, but glanders is mentioned in Arkansas, California, Florida, Iowa, Maryland, South Carolina, Tennessee, and in New Orleans. Rabies may not be imported into Florida and eighteen states have laws against the introduction of tuberculosis.

Many of the state laws provide that the cattle commissioners, or in some cases the governor, shall proclaim quarantine either at the state boundary or against any infected locality; but such power is rarely exercised against any of the diseases that are here considered. In Texas, however, on 28 December, 1899, the governor issued a proclamation against the importation of tuberculosis.

Notification. If a communicable disease once breaks out in a community, it is impossible for the authorities to take any action unless they are made aware of the facts. As in human so in animal diseases, it is required that persons having a knowledge of the existence of such disease or suspecting it, shall notify the board of health or the cattle

[1] Massachusetts, Chapter 491 of 1894, Secs. 24–5.

commissioners as the case may be. Thus the owner is required to report in Arizona, Illinois, Louisiana, Maine, Mississippi, Ohio, Rhode Island, Tennessee, and Virginia, any person who knows of the case in Colorado, Michigan, and Wisconsin, and veterinarians in Connecticut. Usually such reports are to be to the cattle commissioners or similar officials, but in Colorado, Maine, and Tennessee the reports are to be made to the board of health, and in Mississippi to the county supervisors. In Massachusetts, Maine, New Jersey, and Wisconsin the local board of health, and in Connecticut the selectmen are to notify the state officials of any cases which come to their knowledge. In a number of Massachusetts cities and in Charleston, Jersey City, and New York City the owners or persons having knowledge are to report to the board of health, and in Minneapolis, New Orleans, New York City, and Yonkers, veterinarians are to report.

It has been found in practice with human diseases, impossible to rely upon reports from the friends or relatives of patients. If it were not for physicians, a very much larger number of cases would go unreported than does now. In animal diseases there is usually no physician to rely upon. The owner looks after his animals himself and usually is unable to make a correct diagnosis. It is generally for his interest if he does know of a case to conceal it, and concealment of animal diseases is comparatively easy. Hence if state and city officials relied upon reports from owners very few cases of animal disease would come to their notice. It is through the operation of special inspectors that most cases of animal disease are brought to light. The appointment and duties of such inspectors will be referred to later. In some of the western states, as Missouri, the law provides for the investigation of rumors, for the statute provides that on the request of six citizens, who state their belief that communicable disease exists, the state veterinary surgeon shall be sent to investigate.

Investigation and Diagnosis. Most of the laws which provide for any executive action in cases of communicable disease of animals provide that the officials shall investigate cases of suspected disease and determine its nature and that they shall for this purpose have free access to all animals, and that the owners shall give all required information, and shall do nothing to obstruct the action of the officers. In Massachusetts the officials are authorized to put the witnesses under oath. In some states, as Colorado, Iowa, and Maryland, the state officer is a veterinarian, and in most states the cattle commissioners are authorized to employ skilled persons to determine the nature of the disease. Such cities as Boston, Lynn, Minneapolis, New York, St. Paul, and San Francisco, that have attempted to deal energetically with these diseases, employ a veterinarian.

[illegible] animals [illegible] rabies [illegible] dogs, and the other [illegible] [illegible] rabies. Most laws require the destruction of those affected with communicable disease. Several [illegible] [illegible] [illegible] to quarantine with the [illegible] [illegible] communicable disease. However, the [illegible] [illegible] [illegible] the owner the duty of [illegible] [illegible] [illegible] to [illegible] at other times [illegible] [illegible] [illegible]

most states, however, the question of killing is optional with the executive officers of the state. Almost all such officers are authorized to kill if they deem it necessary. Most of these states also provide for compensation to the owner.[1] Almost every one of them (excepting Minnesota, Michigan, and Illinois) provide that the value of the animal shall be before killing determined by the state officers and owner, or in case of their failure, by appraisal. Usually, however, a limit is set to the compensation to be made. In Connecticut, Michigan, and Oregon, it is the value at the time of killing, in Massachusetts the value at the time of killing with a maximum of $40; in New Jersey for tuberculosis three-fourths of the value at time of killing with a maximum of $100 for registered animals, and $40 for non-registered; in Maine one-half value in health, with a maximum of $100 for pedigree animals and $50 for others; in New Hampshire one-half value in health up to $100; in New York one-half value in health up to $60 for registered cattle, and $50 for horses, but for tuberculosis the limit is $25 for non-registered cattle; in Pennsylvania the limit is $50 for pedigree animals, and $25 for others, and for horses $40 and one-half value in pedigree horses; in Rhode Island the amount is one-half value when well, and in Vermont the same with a maximum of $40. In Iowa the limit is $25, and in Kentucky $50 in cases of tuberculosis. Several states attach other conditions to the payment. In Maine the animal killed must have been in the state three years, in Connecticut six months, and in Rhode Island three months; in Michigan and New Mexico it must not have been imported, and in Massachusetts it must (in tuberculosis) have been kept in a sanitary manner. In Maine and New Hampshire if the owner declines to accept the appraised valve, the animal is "quarantined" at his expense and he is liable to a heavy penalty for breaking the quarantine.

Disposal and Disinfection. Several of the states have laws in regard to the disposal of bodies of animals dead with communicable disease. In Arizona they must be burned, in Louisiana, Maryland, and Ohio burned or buried, and in Delaware the owner must cremate cases of anthrax for which he is paid by the state $8 for large animals, and $2 for swine, and $1 for sheep. In Maine and North Dakota they must be buried within twenty-four hours, and in North Dakota they must be buried six feet below the surface of the ground. In Maine, however, they may be rendered within forty-eight hours after death, but in all

[1] Among such are Connecticut, Iowa, Illinois, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Vermont, West Virginia, and Wisconsin.

mass in that state the cattle commissioners must promptly inject the mallein into the carotid artery with kerosene. In New York the flesh of slaughtered animals is sprinkled with kerosene.

Connecticut by statute requires the disinfection by the owner of premises occupied by glanders, but most of the states leave disinfection to the executive officers.

Various methods have been adopted in the different states for executing the laws relating to animal diseases. In some a single officer is to inspect animals, isolate or destroy those infected and otherwise enforce the laws. Such an officer may have assistant inspectors, and must do so if his work is to be efficient. States which have a state veterinarian are Arkansas, California, Colorado, Idaho, Iowa, Louisiana, Maryland, Missouri, Montana, North Dakota, Oregon, South Carolina, South Dakota, Virginia, Wisconsin, and Wyoming.

In other states the executive is a board or commission, and in some of the above named there is nominally such a board. In Delaware, Florida, Kentucky, Minnesota, Mississippi, Nebraska, Utah, Washington, West Virginia, and New York the state board of health is charged with these duties, but in Minnesota and Washington the veterinarian of the experiment station, and in the others the veterinarian of the agricultural college is to have charge of the work. In New York the execution of the animal laws relating to glanders and tuberculosis is entrusted to the state board of health, the tuberculosis committee of which looks after that disease. In Georgia, North Carolina, Rhode Island, and Vermont the state board of agriculture is to look after diseases of animals. In New York the commissioner of agriculture attends to all diseases except tuberculosis and glanders. In Arizona, Colorado, Connecticut, Illinois, Indiana, Kansas, Maine, Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New Mexico, Ohio, Oklahoma, Pennsylvania, Tennessee, and Texas a special commission is created. In New Hampshire the cattle commissioners consist of the secretary of the board of health, the secretary of the state board of agriculture, and the master of the state grange. In New Jersey the tuberculosis commissioners consist of the president and secretary of the state board of agriculture, and three persons appointed by the president.

Most of the cattle commissioners are appointed by the governor and serve for terms of years. Many of them receive a compensation of $3 to $5 per day of actual service. In New York the members of the tuberculosis committee of the state board of health receive $800 per annum. When a veterinarian is the executive he usually receives a reasonable salary. The commissioners are usually authorized to employ inspectors

and veterinarians, and it is through these that the actual work is chiefly done. In Colorado there were, in 1898, seven inspectors; in Illinois, fifty-eight; in Iowa, twenty-three; in Maryland, fourteen; in Minnesota, six; in North Dakota, nine; in Washington, four; in Wyoming, six. In Massachusetts at one time 465 inspectors were employed.

Not only have state officials done something towards the suppression of communicable disease among animals, but in some instances the municipalities have aided in this work and occasionally gone further than the state officials. In Massachusetts, Michigan, and Minnesota the local boards of health conjointly with state boards, are charged with the duty of enforcing the laws in regard to the communicable diseases of animals. In Massachusetts also the local boards of health are required to appoint inspectors of animals and provisions. In Boston, Lynn, and Brookline, and some other towns these inspectors are veterinarians. Veterinary physicians are also employed by the board of health of some other cities to look after the contagious diseases of animals. Among such are the District of Columbia, Denver, New York City, Minneapolis, St. Paul, Omaha, and San Francisco. In almost all of these the attention of the officers is chiefly devoted to tuberculosis, and employment of the officer was necessitated by the attempt to control the health of the animals furnishing the milk supply to the city. In other cities veterinarians may be occasionally employed to investigate special outbreaks as of glanders, or to make an experimental inspection of dairy cows.

Tuberculosis.

The importation of tuberculous cattle into the United States is guarded against by the inspectors of the bureau of animal industry. While this bureau might under the laws attempt to prevent the passage of tuberculosis from one state to another, it has not as yet had the means for doing so. This is at present controlled by the states and eighteen of them have laws respecting it, among which are Iowa, Maine, Massachusetts, Montana, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Texas, and Vermont A common form of the law is that requiring that no animal shall be imported without a certificate that it has been inspected and tested with tuberculin with negative results.[1] In

[1] Rhode Island, Act of 15 May, 1896:

"SEC. 2. All persons, corporations, or companies intending to ship, transport, or to drive cattle into the state must produce a certificate to the effect that the cattle to be shipped, transported, or driven are free from tuberculosis as far as may be determined by physical examination and the tuberculin test. The certificate shall give a description of each animal brought into the state sufficiently accurate for identification, and shall give also the date and place of examination of each animal, the preparation of tuberculin used, the quantity injected, the temperature

Texas cattle must not be imported for breeding or dairy purposes, but an exception is made in favor of animals certified to as natives of Colorado or Nebraska. In New Hampshire animals may be brought in for pasturage only, without the tuberculin test, provided they are sound on physician's examination. In Connecticut, when any one imports cattle from an adjoining state he must within six days notify the commissioner on domestic animals.

Very little work has been done in eradicating bovine tuberculosis by municipal health officers except in connection with the protection of the milk supply, as was noticed in the chapter on dairy products. Nearly all the active work except in a few cities, as Indianapolis, New York, Minneapolis, St. Paul, Rochester, and Lynn, has been done by state boards of health, and hence does not properly belong to our subject; but the matter is one of such moment, and is one which so many local boards of health are considering, that it is worth while to note what the states are doing. Much of what follows is taken from the seventh report of the state veterinarian of Maryland.

Illinois.

"The live stock commission has been conducting tests on herds where the owners apply for it. All animals reacting are slaughtered without compensation, the owners having whatever proceeds there may be from the sale of the hide and carcass; where the disease is slight, the beef may be sold, if fit, for food. During the year 1897, thirty-six herds were tested, including 851 animals; of these seventy-seven were found diseased, or about nine per cent. (This percentage includes a herd of 251 that had previously been tested.) Of the seventy-seven diseased animals, forty-one carcasses were condemned and thirty-six passed as fit for food."

Massachusetts.

"Under Chapter 491, acts of 1894, some four hundred and sixty-five inspectors were appointed, whose duty it was to inspect cattle and stables and report the occurrence of any contagious disease. All cattle visibly affected with tuberculosis were killed and paid for, while many were tested at the state's expense at a cost of $240,737.84. This does not include the cost of testing many more cattle, which was made at the expense of individual owners.

"Condemned cattle were paid for upon written application for the test to be applied, and upon the promise to thoroughly disinfect their premises, and to introduce none but cattle tested (at owner's expense) in the future. This led to an order that cattle to be paid for must be tested by the cattle commissioners or their authorized agent. The large amount of money spent and the number of animals

immediately before inoculation, the temperature at the eleventh hour, and every two hours subsequent thereto for at least ten hours or until the reaction is completed. The certificate shall be signed by a veterinarian who is a graduate of a recognized veterinary college, and shall be sent immediately to the secretary of the state board of agriculture, who shall immediately notify a commissioner of the county into which the cattle are to be shipped, transported, or driven, and said commissioner shall examine the cattle to identify them. Failure to comply with the law shall be considered a misdemeanor, punishable by a fine not to exceed one hundred dollars."

The above law was recently weakened by amendment.

destroyed caused great opposition and resulted in a change of policy. It is now required by law that each town and city shall appoint an inspector who will act in conjunction with state boards.

"This work may be considered under three heads :—

"1. The supervision of the traffic in live cattle brought into the state.

"2. A general inspection, the examination of cattle quarantined as diseased by the local inspectors in the various cities and towns, and the payment for those found to be infected with tuberculosis.

"3. Testing entire herds for the purpose of permanently eradicating tuberculosis from the premises."

In 1899 $75,000 was appropriated and only $50,000 was to be asked for the next year. Seven hundred and eighty-five tuberculous animals were killed for which $17,277.69 was paid. Five hundred and sixty-five animals were tested for owners who were trying to free their herds, and of these sixty-three were condemned.

Maine.

"Maine was the first of the New England States to adopt the system of placing quarantines on the admission of out-of-state cattle. The law was first enforced in 1892 against Massachusetts, because of the large per cent. of Massachusetts cattle that were found diseased. Later it was placed on all out-of-state territory, except to such as were provided with certificates of tuberculin test. The authorities in Maine test herds only on the voluntary application of the owner. The owner to receive one-half the value, as determined on the basis of health before infection, the limit of compensation being one hundred dollars for pedigreed animals and fifty dollars for others. The commission have power to investigate as to the existence of disease and to condemn and destroy such as show physical evidence of disease. During the year 1898 415 head of cattle were destroyed at an appraisal of $18,122."

Michigan.

"Cattle found to be tuberculous are quarantined and killed. The law does not provide compensation, however, and, as a result, the commission has met with a good deal of opposition. The commission has followed the plan of testing with tuberculin such herds as have been brought to their attention as suspicious, killing such as react, with compensation.

"During 1897 and 1898 the commission has applied the tuberculin test to nearly 1,000 head of cattle, a goodly proportion being milch cows. In fact, a larger number of cattle have been tested for tuberculosis during the last two years than had previously been tested since the tuberculin test was adopted by the commission.

"The tuberculin test is applied only when suspicion is directed toward, or complaint made of, either a single animal or an entire herd. The records of tests made show but a small per cent. of infected animals, and when we consider the fact that only suspicious herds are tested, we feel safe in estimating that less than two per cent. of the cattle in Michigan are affected with tuberculosis."

Minnesota.

"All cattle which show symptoms of tuberculosis must be quarantined at once and the entire herd tested with tuberculin. When cattle have once reacted the owner has his option of having them killed or continued in quarantine for a period not to exceed three months, when they are again tested. If they react on the second test, they must be killed within one month. The owner has no compensation for cattle killed, but he is allowed to have them killed under inspection, and, if they pass, he can dispose of it like any other beef. In 1898, 2,975 cows mostly furnishing milk to St. Paul were tested and 6.37 per cent. were condemned."

Glanders.

As in tuberculosis so in glanders a number of states specifically forbid the importation of the disease, and in others the general laws against the importation of any communicable disease would of course include this. Alabama, Arkansas, California, Iowa, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, New York, Oklahoma, Tennessee, Washington, and Wisconsin, provide that all glandered animals shall be isolated or killed, and usually impose upon the owner a penalty for failure to do this. It is also often forbidden to drive upon the highway, or to expose in public, or to sell a glandered animal. The authorities having charge of such matters are usually empowered to kill glandered animals, and sometimes, as has been noted, compensation is allowed. It is often required that owners shall report glandered animals. Besides the states referred to many cities have regulations in regard to this disease among which may be mentioned Atlanta, Charleston, Chicago, Cleveland, Denver, the District of Columbia, and Omaha.

These laws are sometimes enforced by state boards and sometimes by city officials, and in some states, as Massachusetts and Minnesota, the state and local officers co-operate. In Michigan the live stock sanitary commission in its report for 1898-9 states that pursuing a policy of exterminating the disease has nearly eradicated it from that state. The Illinois state board killed 90 horses in 1898 and tested many more, using mallein. Pennsylvania reports very little glanders, only 13 cases having been discovered in 1898. In Minnesota on the other hand in 1898 507 suspected cases were reported of which 317 were killed without compensation. In Massachusetts also the disease is on the increase and there were killed 543 animals, much more than ever before. In Boston and Lynn the control of glanders and rabies is vested in the board of health. Bacteriological examinations are made in cases of suspected glanders in Boston, a serum tube and swab being used, very much like a diphtheria outfit. In 1899 193 animals were examined and killed. In Lynn 14 horses were examined and 8 killed. The New York City board of health does a little in the way of examining horses and also prepares mallein for the purpose. In Minneapolis and St. Paul glanders receives considerable attention from the health department, and in the former city, in 1899, a large number of horses were examined, of which 129 were killed, and it was stated that the disease was increasing.

Rabies.

This disease is not very common, being unknown in some parts of the country but sometimes occurring with considerable frequency in others; but it is one which appeals strongly to the fears of many,

although its existence is denied by some. There is not much statutory legislation in regard to it. In Florida it is forbidden to import it, and in that state and in Alabama, Massachusetts, and Michigan cases must be killed or isolated (in Alabama for six months). New York City, Minneapolis, and the District of Columbia have similar regulations. In Boston the owners of rabid animals must report them to the board of health and the latter has authority to investigate and condemn. In most states the same action could be taken under the general laws relating to the communicable diseases of animals. In Massachusetts every dog license must have printed upon it a description of the disease. Aldermen and selectmen are empowered to order that all dogs shall be muzzled and the health officer of the District of Columbia has similar authority.

In Pennsylvania in 1898[1] there were fifty-five authenticated cases of rabies in dogs, three in horses, six in cattle, four in pigs, one in a goat, ten in sheep, and four in human beings. Most of these cases were in Allegheny and Beaver counties, and the live stock sanitary board issued an order for the muzzling of all dogs in those counties for sixty days. In Minnesota from 1896 to 1900 at least eighty-four cases of rabies came to the knowledge of the state laboratory, in thirty-one of which the diagnosis was proved. Four of these were in human beings.[2] If it is possible to secure with certainty all animals bitten by a rabid one they may be killed or quarantined, but if it is suspected that infected animals are at large all dogs should be muzzled, as it is by dogs almost entirely that the disease is spread. The adoption of these methods is said to have almost exterminated the disease in England. In muzzling a considerable area should be included, and for this reason the Massachusetts law which leaves it to the towns is bad. There has been considerable rabies in eastern Massachusetts, and the towns and cities have from time to time enforced a muzzling ordinance. In Lynn, Boston, Minneapolis, St. Paul, and Denver, in 1898, numerous animals were killed and examined for rabies by laboratory methods, but difficulty was experienced in the latter city owing to trouble in getting the necessary rabbits on which to test the virus. In Massachusetts of thirty cases tested from March, 1897, to December, 1898, by the pathologist of the state board of cattle commissioners, twenty proved to be rabies.[3]

In the District of Columbia[4] the number of cases of rabies in dogs,

[1] Pennsylvania, Report of State Veterinarian 1898, p. 12.

[2] F. F. Wesbrook, St. Paul Medical Journal, October, 1900.

[3] Journal of Boston Society of Medical Sciences, Vol. 3, p. 83.

[4] Bureau of Animal Industry, Department of Agriculture, Circular No. 30, 1900.

as demonstrated in the laboratory, was in 1898, seven; in 1899, nineteen; in 1900 (to March 31), fifteen. From October, 1899, to 30 April, 1900, twenty-four human beings in the District were bitten by rabid animals. A six months muzzling order is now in force, but was met with much popular opposition. It is the opinion of the health officer that the muzzling should continue for a year. At the present writing (January, 1901,) the mayor of Rochester has just issued an order that all dogs shall be muzzled for six months.

In some cities, as Jersey City and Hoboken, the licensing of dogs is in the hands of the local board of health.

School Hygiene.

The sanitary construction of schoolhouses and management of schools is a matter of vast importance. Yet there is a great amount of ignorance displayed in both the construction and management. Defects are of course often seen by school boards when they cannot remedy them, simply because they have no money; but oftentimes the reason why the defects exist is because they are not seen. The primary object of our school system is of course the mental training of the young, and those who are most fitted to provide this are not always the best fitted to provide for the physical welfare of the pupils. Health officials who are devoted to their work always take an active interest in the schools of their district, but there are decided limitations to the good which they can accomplish. The management of the schools is in another department, and one noted defect in our methods of municipal government is lack of co-ordination between its different departments. The health department rarely has any control over the school department, and advice is usually not heeded. Even if the health department can issue orders to the school board it would rarely be wise to do so, for the result would be likely to be a quarrel which would do no good to either. For these reasons it has come about that health officials have done far less for the advancement of school hygiene than might have been expected. There has also been comparatively little legislation concerning hygiene of schools. A compilation of the laws on this subject was made by the United States commissioner of education in 1894[1] and is not very voluminous. Laws and ordinances in regard to vaccination and communicable diseases have already been considered. Many states also have laws prescribing the strength of school buildings and how they shall be constructed so as to be as secure as possible against fire. Many states also require that schools shall be provided with fire

[1] Report of Commissioner of Education (1893–4), p. 1301.

escapes, and that doors shall open outwards.[1] Such regulations hardly come within the scope of this work.

One of the most important means of improving the construction of schoolhouses would be to have the plans of all buildings about to be constructed submitted to some competent authority which could compel such plans to be made in accord with recognized sanitary principles. Such control has not generally been very successful in the United States, because it is not easy to find a central authority which is really competent to pass upon schoolhouse plans, and because such an interference by the state in local affairs, or such control of one municipal department by another is not acceptable. In a few states as Colorado, Denver, Kansas, Tennessee and Wisconsin the state board of health is authorized to advise with the school authorities in the construction of schoolhouses, and in other states the state board under its general grant of power does so advise, but Vermont is the only state where it does exert any direct control. In California, Kentucky, Virginia and West Virginia the county superintendent of schools, and in New York the state commissioner, is to approve all schoolhouses, and in Pennsylvania the state superintendent of schools is to prepare plans and estimates of different types of buildings for the use of local school boards. It is only in Massachusetts, Connecticut, and Vermont that any efficient control of school construction is exercised by officers outside the school department, and even then the supervision only covers construction, fire, and ventilation. In Massachusetts the factory inspectors who are state officers are to approve all schoolhouse plans, after which no change can be made in them.[2] It is further provided in Massachusetts[3] that the factory inspectors may compel changes in the ventilation of school buildings, and any school or other official who fails to obey an order of a factory inspector within four weeks is to be fined not to exceed $100. The act establishing a board of health in Detroit gives that board similar power. In Oklahoma the rules of the

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[1] Among states which have such laws are Colorado, Connecticut, Illinois, Indiana, Massachusetts, Maine, Michigan, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, Ohio, Pennsylvania and Wisconsin.

[2] Massachusetts, Chapter 388 of 1894.

[3] Massachusetts, Chapter 508 of 1894, Sec. 42:

"Whenever it shall appear to an inspector of factories and public buildings that further or different sanitary provisions or means of ventilation are required in any public building or schoolhouse in order to conform to the requirements of this act, and that the same can be provided without incurring unreasonable expense, such inspector may issue a written order to the proper person or authority directing such sanitary provisions or means of ventilation to be provided, and they shall thereupon be provided in accordance with such order by the public authority, corporation or person having charge of, owning or leasing such public building or schoolhouse."

state board of health give this right to local boards, and in Connecticut the state board of education has similar powers. The insertion of the terms "without unreasonable expense" in the Massachusetts law it is to be feared, makes it difficult to improve those houses that most need it. In Vermont[1] the state board of health is directed to issue a circular of information on schoolhouse construction and the statute provides that:

"All school houses hereafter built shall be constructed in respect to lighting, heating, ventilation and other sanitary arrangements according to regulations furnished by the state board of health."

In New York cities of the second class the health officer can stop the erection of any public building which is not satisfactory.

Nine states, Connecticut, Iowa, Kansas, Massachusetts, Maryland, Nebraska, Nevada, New York, and Pennsylvania require that schoolhouses shall be provided with a suitable number of privies, water-closets or earth-closets. A number of the states require that privies for the two sexes shall be provided and that they shall be separated, and in Pennsylvania[2] unless they are at remote distances the approaches and walks shall be separated by a substantial close fence not less than seven feet high. The Massachusetts law[3] requires that "every schoolhouse shall be kept in a cleanly state and free from effluvia arising from any drain, privy, or other nuisance." Pennsylvania[4] goes further and prescribes how the schoolhouses shall be kept clean.

Most of the labor of keeping the schoolrooms clean seems to be lost if the children are allowed to remain filthy. In the country the problem of keeping the children clean is not so serious a one, but in city

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[1] Vermont, Chapter 102 of 1896.

[2] Pennsylvania, Chapter 279 of 1893.

[3] Massachusetts, Chapter 508 of 1894, Sec. 4.

[4] Pennsylvania, Chapter 165 of 1895:

"SECTION 1. Be it enacted, etc., That the boards of school directors and controllers of each school district of this commonwealth, be and they are hereby required at least once during each school term, and prior to the first of January of each year, and within thirty days after the close of each annual school term, to have taken out, removed and hauled away all excrement and waste matter from every out-house or water-closet connected with or standing upon the premises of every public schoolhouse in the commonwealth, or have the same properly disinfected; and they are required to have every out-house or water-closet properly scrubbed, washed out and cleaned, the inside walls whitewashed, and the vaults or receptacles covered with a layer of fresh dirt or dry slacked lime within ten days of the opening of each annual school term.

"SEC. 2. That the president of each board of school directors or controllers is required each year to certify in the regular form provided for that purpose, that the requirements of this act have been fully carried out before the district can draw its annual appropriation from the state."

schools in the poorer sections of the city it is more difficult. Many of the city school boards have rules forbidding children to be in school who are unclean in person or dress. Such a rule is, however, not easy to enforce, and children are rarely sent home for failure to comply with its requirements. Boston, in one school, the Paul Revere School, seems to have solved the problem, at least so far as cleanliness of person is concerned. Shower baths have been constructed in the basement of the school for the use of the pupils. On the boys' side the baths are all in one room around the sides of which are arranged benches on which the boys may sit while undressing, and above are hooks on which they may hang their clothes. On the girls' side separate dressing rooms and separate bathrooms are provided, making the girls' outfit much more expensive than the boys'. Soap and towels are free. Bathing is not compulsory, but practically all the children use the bath. For this purpose each room is given one hour a week of the regular school time. Similar baths have recently been put in a public school in New York City.

The heating and ventilation of schoolrooms is of the utmost importance, but there is practically no statutory legislation in regard to it, except that of Massachusetts and Connecticut above referred to. New York City,[1] Chicago, and some others following them, have a general rule which requires that the ventilation and heating as well as everything else about schoolhouses shall be managed as well as possible,— a rule so general in its provisions that it is probably of little use. In the school board rules of several cities regulations are found concerning ventilation, heating, temperature of the rooms, form and size of seats, methods and manner of cleaning, etc., but rarely or never are these matters regulated by the department of health. None of these matters appear to be touched by statute law except in Kentucky.[2]

The thorough inspection of schoolhouses is desirable to discover what defects ought to be remedied and what can be remedied at a rea-

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[1] City of New York, Sanitary Code (1899), Sec. 190.

[2] Kentucky, Statutes (1894):

"SEC. 4440. . . . Each schoolhouse hereafter erected shall have a floor space of not less than ten square feet to each pupil in the district; shall be at least ten feet between floor and ceiling; shall have at least four windows, one or more fireplaces, with chimneys made entirely of brick or stone, or a sufficient number of stoves or other heating apparatus, with safe flues, to warm the room in the coldest weather. . . . The trustees shall furnish each schoolhouse with at least the following articles of furniture and apparatus, . . . a seat, patent or otherwise, with back, for each child, the height of the seat and its back to suit the age of the child. . . .

"SEC. 4447. . . . They shall see that a sufficient supply of good water is furnished within easy access of the schoolhouse for the benefit of the school during the term of school. . . ."

sonable expense. Massachusetts has provided for such inspection by its state factory inspectors and in Ohio[1] local boards of health are "required to inspect semi-annually and oftener if in the judgment of the board it shall be deemed necessary, the sanitary condition of all schools and school buildings within its jurisdiction." Other boards of health, both local and state, have considered such inspection to be within their field of work, even if not expressly so stated by statute. Sometimes school inspection is undertaken by special committees appointed for that purpose as in Boston in 1896 by a committee appointed by the mayor, or in Philadelphia by an expert, Prof. S. H. Woodbridge, appointed by the Woman's Health Protective Association. Sometimes such inspections are made by the state board of health, as in South Carolina[2] and Wisconsin.[3]

More often, however, the inspection of schoolhouses is undertaken by the local board of health. Such an inspection may or may not be of much value. To be of value it should be thorough and the inspector should be sure of his conclusions and wise in his advice. Furthermore, such inspection is of much greater usefulness when conducted with the hearty co-operation of the school board. If there is any antagonism between the health officers and the school officers, or if the criticisms of the health officers are directed as much at the school board as at the schoolhouses, little good is likely to come of the exposure of defects. In a word, little good can be accomplished unless the two departments act in harmony. Usually it may be assumed that school boards desire to have the houses in the best possible sanitary condition. What they need is money to put them in this condition, and the health officer if he acts with tact can do much to help them to get the money. Among local boards of health which have made such inspections, may be mentioned Alameda, Cal., in 1888, District of Columbia in 1897, Lawrence in 1888, Lowell in 1888, Lynn in 1888, Manchester, N. H. in 1897, Mansfield, O. in 1891, Minneapolis in 1890, Reading in 1891, Providence in 1886 and 1896, Rochester in 1897, Sacramento in 1897, St. Louis in 1896-7, Utica in 1897. Among the most complete of these inspections are those of the District of Columbia, Providence, Rochester, and Reading. School inspections should in order to increase knowledge of schoolhouse sanitation, and to carry more weight to the councils to whom they are addressed, be quantitative as well as qualitative. The measuring tape and the anemometer, but particularly the former,

[1] Ohio, Annotated Statutes (1900), Sec. 2135.

[2] South Carolina, Report of State Board of Health (1895), pp. 61–89.

[3] Wisconsin, State Board of Health Report (1889), p. 53, *et seq.*

should be always in the hands of the inspector. The report of the inspection in Reading is an excellent example of what can be done in this direction, and the tabular statement of results is the most complete that the writer has met with in any health report. In Providence the anemometer was used in every school, and in some tests a recording anemometer was used for a number of days. Special attention in that city was given to the alleged "back draughts" of the "Smead System" and to investigate this a recording instrument was used to indicate any reversal of the air current. Various schedules have been devised to be used in the inspection of schools.[1] The following was the schedule used in Providence:

SCHOOLHOUSE INSPECTION.

Name. Location. Character of Site.
Date. Temperature outside. Direction of Wind. Force of Wind.
Number of Room. Size. Number of pupils.
Recitation Rooms. Size. Number of Pupils. Heating. Ventilation. Lighting.
Cloak Rooms. Ventilation.
Stairs. Position. Width. Tread. Rise.
Fire Escapes.
Doors inside, open in or out. Outside, open in or out.
Ventilation and Heating System.
Position of Inlets. Size. Rate of Flow. Open or closed (how regulated).
Position of Outlets. Size. Rate of Flow. Open or closed (how regulated).
Size of Fresh Air Inlet. Size of Outlet Shaft.
Temperature. Method of Regulating.
Windows. Number. Size. Height from Floor.
Shutters. Blinds. Curtains.
Storm Windows. Weather Strips. Window Ventilation.
Plumbing. Set Bowls. Waste Pipes. Soil Pipes. Traps.
Water Closets. Latrines. Sewer Connection.
Water for Drinking. Filters. Cups.
Excreta Disposal. Method.
Desks.

In Rochester the amount of carbon dioxide determined by the Winckler apparatus, and the humidity by wet and dry bulb were noted for each room.

In Philadelphia and Milwaukee the regular medical inspectors have been required to make inspections of the public schools. These routine inspections are of course not as thorough as those just referred to, but are carried on in order to correct minor defects in management and to discover the smaller structural defects, though of course the larger defects if not corrected are noted again and again. It had been hoped by the writer that the daily medical inspection of schools would furnish

[1] Report of U. S. Commissioner of Education (1893-4), p. 1348.

a means of doing much to assist and correct janitors and teachers in their care of the schoolhouse, but it does not appear from reports that much has yet been done in this line.

Medical Inspection of Schools.

To Dr. Samuel H. Durgin of the Boston board of health is due the credit of inaugurating this method of improving the sanitary condition of school children. The principal aim in undertaking this inspection was to bring to light unrecognized cases of communicable disease, and it was hoped thus to do much to check the spread of these diseases among school children; but it has been shown that much good is accomplished in other directions, and it is not unlikely that the control of communicable diseases will come to be considered as a very minor part of school inspection. Such an inspection was urged by the Boston board of health as early as 1890, but was not set in operation until 1 November, 1894.[1] Parochial as well as public schools are included in the scheme. The city is divided into fifty districts and an inspector is appointed for each district. There does not seem to be any difficulty in securing enough competent physicians, and vacancies are easily filled. The salary is $200 per annum, but the inspector is required to visit at their homes, at least twice, all cases of diphtheria and scarlet fever reported in his district. Each inspector has four or five schools and about 2,000 children. The inspector visits each school soon after the opening of the morning session. The teacher has already noted whether any child appears to be ill or in any way to need the advice of the inspector. Sometimes the teachers agree to put a card in the window when the inspector is needed so that he may not have the trouble of entering the building unless it is necessary. The principal receives early in the session, from each of the teachers, a notice of any child which may require attention.

It will be seen that after all the teacher has the most responsibility in these inspections. If the teacher is intelligent and observing, the work will be successful, otherwise not. In Boston it is found that the teachers with a little instruction become very adept in recognizing cases that need attention; and the teachers appear to greatly appreciate the aid which is given by this inspection. While it has given them a new duty to perform each morning, it has relieved them of the burden of deciding what to do with the doubtful cases.

In Boston at first a book was kept in which were entered the cases

[1] Paper read by Samuel H. Durgin, M. D., before the Massachusetts Medical Society, 9 June, 1897.

to be sent to the inspector, but slips like that shown below[1] have been substituted for it.

In New York it is required by a rule of the board of education that if the teacher suspects that a child may have a communicable disease, it is to be isolated in a separate room until the inspector arrives. Doubtless the same plan is followed in other cities. Unless the case is suspected to be a communicable disease, or unless the teacher feels that it is too sick to remain even a short time, the pupil goes on with its tasks as usual. In Boston the inspectors see the majority of the suspects in the hallway, but if small rooms are available they may be used. If the inspector finds the child too ill from any cause to remain at school he advises the teacher to send the child home for the observation and care of its parents and family physician. In New York when a child is sent home a card is sent with it, stating the reason for exclusion. If the illness is a dangerous communicable disease, the child is at once ordered home. In Philadelphia where the inspection is not under the health department, a special form of report card is used for communicable disease. Of course many cases of sore throat are seen, and in these it is the routine practice to take a culture before sending the child home. In Boston the inspectors frequently do not carry culture outfits, but take the suspects to the nearest culture box station. Of course, often, perhaps usually, the inspector desires to see the teacher and give some explanation of the case, but in any event he fills out the slip relating to the case and returns it to the teacher. The inspectors are not allowed to have any of the pupils sent to their own offices for consultation, but they must be examined in the schools or sent to their own physician or to the hospitals.

"The school inspectors do not give professional treatment in any case. They merely point out the need of professional treatment where the need exists. The

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..... 19 .....

[1] KEEP ON FILE.

TEACHER'S STATEMENT.

(Name) ..... *Room No.* .....

..... *School.*

Complaint .....

PHYSICIAN'S STATEMENT.

Diagnosis .....

Advice .....

.....

.....

.....

treatment itself must be received from the family physician, or in the hospitals, or in the dispensaries, and great care is necessary to avoid giving offence to physicians and their families."

The inspectors vaccinate some in Boston but not very much and only the poor; only 260 vaccinations were performed in 1898, but many arms were examined and 1,142 certificates of vaccination filled out. The inspector carries with him a report sheet on which he tallies the cases that he meets with and at the end of the month he writes out this report on a new sheet and sends it to the board of health. See Appendix 122. On the back of this is printed a classification of diseases. A similar but simpler form is used in New York, but a separate report must be made out each day for each school.

In Boston, as indeed in other cities, much trouble has been caused by pediculosis, and in these cases it is not considered necessary to send to the family physician for treatment. The following card is sent to the parent in each case :

" ..... SCHOOL.

" BOSTON, ... 189

..... has been reported by the Medical Inspector of Schools as showing evidence of parasites in the hair, and I am therefore obliged to request that the child be kept out of school for a few days until the disease is cured.

" MASTER.

"The following method of treatment for killing parasites and nits is recommended by the Board of Health: —

"Wet the hair thoroughly with crude petroleum, of which half a pint may be obtained at a drug store. (*See accompanying prescription.*) Keep it wet for three hours. Then wash the whole head with warm water and soap. Repeat this process on three successive days. The nits may then be removed by combing the hair very carefully with a fine toothed comb wet with vinegar. Repeat the combing for several days until no more nits can be found. To make the treatment easier and more thorough, the hair may be cut short if there is no objection.

"All the children in a family are likely to be affected, and should also be treated as above.

" Brushes and combs should be cleansed by putting them in boiling water for a few minutes."

A more simple form, printed in three languages is used in New Bedford.

The child is then not admitted to school until he brings the following slip signed by the parent :

"I hereby declare that on three different days during the past week I have applied crude petroleum to my child's hair, as directed on the card received."

To be signed by Parent or Guardian.

While the more important communicable diseases are not discovered perhaps as often as was expected, outbreaks are sometimes checked as shown by the report of one of Boston's inspectors.[1]

In 1897 the board of health of New York City inaugurated an inspection similar to that in Boston, to include both the public and parochial schools. At present (1899) there are 205 inspectors of which 140 are in Manhattan and 38 in Brooklyn, at a salary of $360, with a chief at a salary of $2,500. The appointment of a chief inspector seems to be almost a necessity in large cities. The work of inspection requires a good deal of special knowledge and much can be done to increase the efficiency of the inspectors by a capable chief. Moreover with a large corps of inspectors there are sure to be some that are negligent or inefficient and these need to be disciplined or discharged. In a small city the executive officer of the health department may well supervise this work of school inspection, but in large cities a special supervision is necessary and has been supplied in New York. In Boston the need of it is felt. In that city the inspectors have attempted to improve their service by having meetings every two months for the discussion of matters connected with their work.

Temporary inspection of schools on the foregoing plan was carried on during outbreaks of communicable diseases in Brookline, Mass., in 1894 and in 1895.[2]

A similar inspection was begun in Hartford in 1899, during an outbreak of diphtheria and the two inspectors have continued their work ever since. In 1899 21,973 children were examined.

In Philadelphia,[3] in 1898 the board of health directed its fifteen assistant medical inspectors to inspect one school each day in accordance with the system employed in Boston. This was done in order to show the benefits of the scheme and secure its final application to all schools. The city has not yet established a paid service, but recently the board of public education has instituted a daily inspection by the voluntary services of physicians, though not enough have offered for all the schools. In that city a circular was sent to each principal explaining the system.

In St. Louis[3] some of the public spirited physicians undertook the same work for a few schools and with the same end in view, but no public inspection has yet been inaugurated.

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[1] Article by H. D. Arnold, M. D., Annals of Gynæcology and Pediatrics, January, 1898.

[2] Brookline, Reports of Board of Health for years ending 31 January, 1895 and 1896.

[3] Report of U. S. Commissioner of Education (1897-8), p. 1492.

In Chicago,[1] owing to lack of funds, the health department was not at first able to establish a daily examination of each school, but in September, 1896, the city was divided into eight districts, each covering an area of about twenty-two square miles, with an inspector for each. These inspectors were to devote their entire attention to the schools and were to look after the vaccinal condition of the children and to supervise all cases of communicable disease reported among the school children, visiting the schools which the children attended and inspecting the pupils when necessary. But in January, 1900, a daily inspection was begun. This work is under the technical direction of the board of health, but it is attached to the compulsory education department of the public school system, and is thus operated under the joint jurisdiction of the department of health and the board of education. There are fifty inspectors who receive $50 a month. They work from nine in the morning until twelve noon. School districts are sub-divided so that each inspector has a certain number of schools to visit each day. Children are excluded who are found to be suffering from contagious diseases, and all children who have been absent for four days or more are required to submit to an examination of their throats before they can return to their class rooms.

An inspection similar to that formerly practiced in Chicago[1] was inaugurated in Milwaukee in 1898, the city being divided into five districts and an inspector appointed for each district.[2] The next year the number of districts was increased to twelve, with five schools in each district, and twelve inspectors were appointed. In each school a "quarantine room" is provided, to which all suspected children are sent and which is used for nothing else. All children who have been out of school two days or are sick must be seen by the inspectors before they are readmitted.

In Newton, Mass.,[3] seven school inspectors are appointed at a salary of $50 per annum, who visit the schools at the beginning of each term and inspect the children, giving especial attention to vaccination and the existence of communicable disease. During the term time suspicious cases if noticed by the teacher are reported to the health department, and so far as possible, examined. This is doubtless done in other cities, but probably only in the more important diseases, as scarlet fever and diphtheria.

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[1] Chicago, Report of Department of Health (1895-6), p. 75.

[2] Milwaukee, Report of Health Commissioner, year ending April, 1899, p. 32, and Report for the year ending April, 1900, p. 30.

[3] Newton, Mass., Report of Board of Health (1898), p. 16.

The results of school inspections are fairly shown by the following table taken from the Boston board of health report:[1]

Number of pupils examined in the schools	17,449
Number recommended to be sent home	2,583
Number consultations with teachers (about pupils returning to school, etc.)	3,089

NOTE.— In further diagnosis the nomenclature of Osler's Practice of Medicine is recommended.

I.— SPECIFIC INFECTIOUS DISEASES.	
Diphtheria	13
Scarlet fever	5
Measles	85
Whooping cough	134
Mumps	77
Smallpox	—
Chicken-pox	82
Influenza	61
Erysipelas	1
Syphilis	—
Tuberculosis	5
Malaria	5
	468

II.— DISEASES OF THE ORAL AND RESPIRATORY TRACT.	
1. Mouth.	
Stomatitis:	
(*a*) Simple (erythematous)	8
(*b*) Aphthous (herpetic)	—
(*c*) Ulcerative	—
(*d*) Parasitic (thrush, etc.)	—
Alveolar abscess	26
2. Pharynx.	
Acute pharyngitis	507
Hypertrophic pharyngitis (acute and chronic)	33
3. Tonsils.	
Acute follicular tonsillitis	1,285
Hypertrophic tonsillitis	550
Abscess	—
4. Uvula.	
Elongation	7
5. Nose.	
Acute rhinitis	31
Chronic rhinitis	5
Purulent rhinitis	13
Ozaena	9
Deviations of septum	1
Epistaxis	23
6. Naso-Pharynx.	
Naso-pharyngitis (Post-nasal catarrh)	25
Adenoid disease	27
7. Larynx.	
Acute laryngitis	39
Chronic laryngitis	2
8. Bronchi.	
Acute bronchitis	141
Chronic bronchitis	3
Acute pleurisy	3
	2,738

III.— DISEASES OF THE EAR.	
Foreign bodies (cerumen, etc.)	7
Otitis media, catarrhal, acute	2
Otitis media, chronic	—
Otitis, media, suppurative, acute	3
Otitis media, suppurative, chronic	121
Mastoiditis	—
Imperfect hearing (without visible cause)	11
	144

IV.— DISEASES OF THE EYE.	
1. Foreign Bodies.	
Foreign bodies	7
2. Eyelids.	
Blepharitis	13
Stye	22
Ptosis	1
Trichiasis	1
3. Lachrymal Organs.	
Obstruction of duct	1
Abscess	—
4. Conjunctiva.	
Conjunctivitis:	
(*a*) Acute catarrhal	148
(*b*) Purulent	2
(*c*) Phlyctenular	5
(*d*) Granular	11

[1] Boston, Report of Board of Health, (1899), p. 51.

5. Cornea.

Interstitial keratitis	5
Ulcer	16
Opacity	6

6. Iris.

Iritis	1
Synechia	—

7. Muscles.

Strabismus	10
Nystagmus	2
Paralysis of extra-ocular muscles	—
Imperfect sight (without visible cause)	178
Unclassified	6
	434

V.— DISEASES OF THE SKIN.

Acne	28
Alopecia areata	10
Dermatitis	55
Eczema	288
Erythema multiforme	2
Erythema simplex	18
Furunculus	20
Herpes simplex	70
Herpes zoster	4
Impetigo contagiosa	19
Pediculosis	2,262
Pemphigus	4
Pityriasis maculata et circinata	—
Pruritus	2
Psoriasis	5
Purpura	—
Scabies	31
Seborrhœa	12
Tinea favosa	13
Tinea tricophytina	104
Tinea versicolor	—
Urticaria	31
Verruca	6
Unclassified	10
	3,252

VI.— MISCELLANEOUS DISEASES.

Anæmia	86
Debility	94
Headache (habitual)	170
Cervical adenitis	78
Chorea	17
Ulcer	25
Deformities spinal	4
Deformities extremities	—
Dislocations	2
Sprains	47
Fractures	2
Contusions	49
Wounds	68
Abscess	33
Dental caries (painful)	37
Neuralgia	57
Epilepsy	6
Rheumatism	21
Cardiac diseases	8
Gastric diseases	57
Intestinal diseases	25
Urinary diseases	8
Vaccinations (performed)	1,216
Certificates of vaccination	1,886
"No disease," no pediculi, & vaccination marks, etc.	4,213
Unclassified	83
	7,413

In New York in 1898[1] 139,965 children were examined and 7,606 were excluded. Of these 118 had diphtheria, 25 croup, 328 scarlet fever, 253 measles, 380 chicken pox, 517 mumps, 1,627 contagious diseases of the eyes, 703 contagious diseases of the skin, 3,502 parasites of the head, and 152 parasites of the body. The average daily attendance was 456,394.

In Cambridge in 1899 there were excluded 372 children, of whom 4 had diphtheria, 5 scarlet fever, 24 measles, 18 mumps, 18 chicken pox, and 57 pediculosis.

[1] Medical News, 21 October, 1899, p. 555.

In Chicago during the first four months of 1900, 16,805 children were examined of which 4,539 were excluded. Of these 170 had diphtheria, 401 scarlet fever, 648 measles, 55 whooping cough, 670 chicken pox, and 1,160 purulent eyes.

Public Baths.

Public baths belong properly to the department of public works, but they are here considered because a number of public baths in American cities are in charge of the health department, and because the health officers are usually greatly interested in this public improvement and are often instrumental in securing it. It is doubtless because of this active interest of health officials that the construction and maintenance of baths is placed in their hands. While municipal baths are common in Europe they are not in this country. Public baths constructed by private effort are found in several cities. Some of these are intended as public charities, the fee charged not being sufficient to pay the running expenses. Examples of such baths are the People's Baths, 9 Centre Market Place, New York, the Baron de Hirsch Bath, corner Henry and Market streets, New York, and the Riverside Baths, 259 West Sixty-ninth street, New York. It has been felt by many that public baths should not be left to private initiative but that the best and surest way to secure this civilizing agent is through municipal action.[1]

Summer Baths. In a number of cities which are so fortunately situated as to permit it, floating baths have been in use for many years.[1] These are moored in rivers or harbors and of course can be used only during a few months in the summer.[2]

In Lowell and Brookline they had to be abandoned on account of the contamination of the water. In New York the first floating baths were constructed in 1870. In 1897 there were fifteen such baths maintained by the department of public works. They are usually kept open from the middle of June to the first of October. The hours are 5 A. M. to 9 P. M., except Sundays, when they close at noon. Mondays, Wednesdays, and Fridays are set apart for women and children.

"All bathers excepting children are required to furnish themselves with bathing dresses, and, to avoid infection, no towels or other toilet articles can be hired at the baths. Two male attendants are in charge of each bath on the days set apart for males, and two female attendants on the other days. A male guard at each bath on women's days, a policeman to keep order, and a keeper at each bath at night are

[1] See Report on Public Baths and Comfort Stations, Mayor's Committee, New York (1897). Most of the facts here given and the quotations are from this report.

[2] Such baths have been maintained in Boston, Brookline, Mass., Brooklyn, Cambridge, Charleston, Cleveland, Hartford, Lowell, Milwaukee, Newton, Mass., New York, Portland, Providence, Taunton, Watertown, Mass., and Worcester.

employed. Each bath has an average of sixty-three dressing rooms, a reception, toilet and retiring room, and is lighted by gas. The baths have a supply of ice water and are thoroughly swept, scoured and washed down nightly. . . . The average cost of construction and equipment of each bath is $13,000 and the annual cost of maintenance and repairs for the fifteen baths is $48,000, including $30,000 for the salaries of attendants. In 1896 there were 3,895,755 male bathers and 1,658,143 female; total 5,553,898."

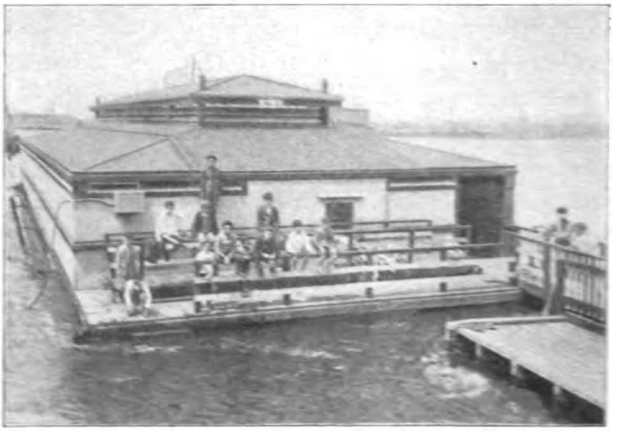


FIG. 196.

A Floating Bath, West Boston Bridge, Boston. From a photograph furnished by the Commissioners of Baths.

FIG. 197.

[illegible] From a photograph furnished by the Commissioners of Baths.

[illegible]

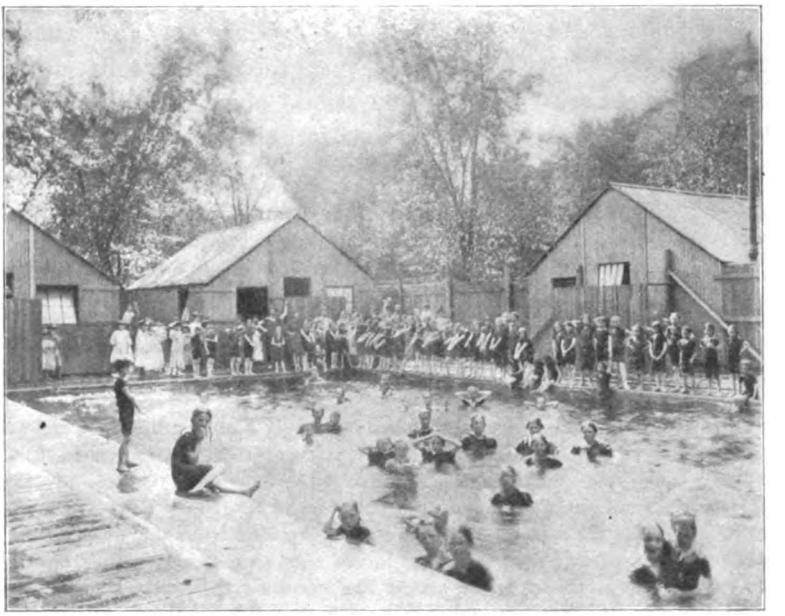


FIG. 108.

Swimming Pool, Orchard Park, Roxbury, Boston. From a plate loaned by the Commissioners of Baths.

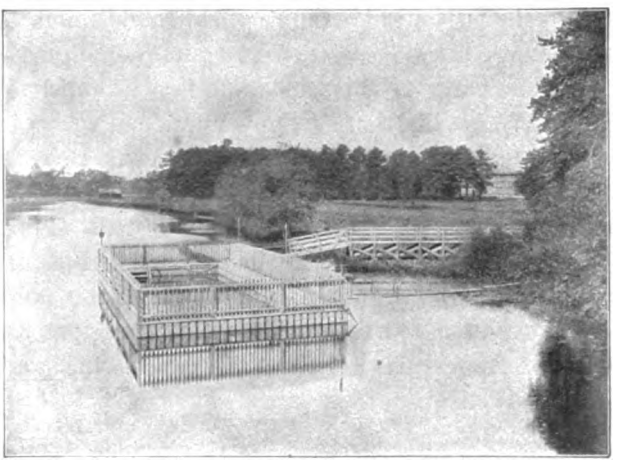


FIG. 109.

A River Bath, Boston. From a plate loaned by the Commissioners of Baths.

commission. During 1897 there were 657,275 bathers of whom 120,915 were women and girls. The total expense for maintenance for that year was $23,768.31. In that year there were thirteen floating houses. The old style floating houses are about sixty by thirty feet with twelve feet posts. They are four feet six inches under water and are supported by tanks holding 8,000 gallons. Sometimes casks are used to float the house. They last several years but are recoopered annually. The baths accommodate about seventy-five bathers at a time.[1]

The new style of floating bath is open to the sky, thus ensuring better ventilation. There are also in Boston six beach baths and two swimming pools and two river baths.

"The swimming pools were established to supply summer baths to the sections of the city without water frontage. One of the pools is at Orchard Park, a small open space with grass and trees in the midst of the tenement districts of Roxbury. It consists of a tank made of concrete, eighty feet in length by thirty feet in width and four feet in depth; to which fresh water is supplied from the city pipes. This tank is enclosed merely by a high board fence. Two or three polling booths temporarily fitted up for the purpose afford the necessary dressing accommodations. Great care is taken to keep the water clean. The surface is drawn off several times daily, and once each day the tank is completely emptied and washed out. Every bather before entering the pool must use the shower bath. Between eighty and ninety thousand gallons of water are used daily."

The number of bathers accommodated at all the Boston baths in 1899 was 1,920,368.

In-door Baths. While the summer or out-door baths are excellent, they can only be used about one-third of the year and even then are not so desirable for cleansing as are shower baths. It is very generally agreed that the rain bath is the best form for general public use, though tub baths and plunge baths have their place in public plants. As was above stated, public baths of this kind were first established by private philanthropic enterprise, but there are now municipal works in a number of cities. Massachusetts[2] has permitted her towns to construct such baths, and New York[3] has required cities of the first and second class to establish baths of hot and cold water which shall be open fourteen hours each day. These baths are to be constructed as the board of health may require. Baths have been built under this law in Buffalo, Rochester, New York, and Utica. The first municipal bath of this character was the Carter H. Harrison Bath in Chicago, which was opened in March, 1893.

[1] Boston, Report of Department of Baths (1899).

[2] Massachusetts, Chapter 125 of 1898.

[3] New York, Revised Statutes (1896), p. 433.

"It is a handsome structure of pressed brick and brown stone, twenty-five feet wide by one hundred and ten feet deep. In the basement are the laundry and two furnaces, one for heating the building, the other for heating the water for the baths. In the front of the main floor is a waiting room sixteen feet square, seating forty people. Beyond this are the bath rooms, with necessary toilet accommodations. There are sixteen shower and two tub baths, and a plunge twenty by thirty feet. This last has not been a success, owing to its small size and to the aversion of people to sharing so small a body of water. Allowing twenty-five minutes to each bather, the capacity of the bath is 2,600 persons a week. Two minutes are allowed for undressing after entering the bathroom, when the water is turned on for eight minutes. One minute's notice is given before the water is turned off, to allow time for a rinse off. Fifteen minutes are allowed for dressing. Women are allowed to use the baths two days a week, men using them the remainder of the time. For women the temperature is 105 degrees, and on days for men, 100 degrees. Many people resort to this bath, not only for the purpose of cleanliness, but for relief for rheumatism and other diseases, with, as they claim, good results."

The bath cost $10,856, and the operating expenses in 1898 were $4,434.72, the total expense for each bath averaging four and one-tenth cents. During 1898, 106,233 baths were given, 25,608 to women and girls. In July, 1896, the remarkable number of 11,250 baths were recorded.

The following account of the Madden bath is from the report of the Chicago Health Department for 1897–8, p. 92:

"The Martin B. Madden bath, at 39th street and Wentworth avenue, was opened to the public, April 17, 1897. The dimensions of this building are as follows:

"The front part of the building, which consists of waiting rooms and office, is 30 feet by 49 feet 6 inches; wing part, which is the bath proper, is 26 by 70 feet, and contains 31 separate dressing rooms and shower baths, one tub bath, and all necessary toilet arrangements annexed. The basement is divided into a boiler room, laundry and soup kitchens.

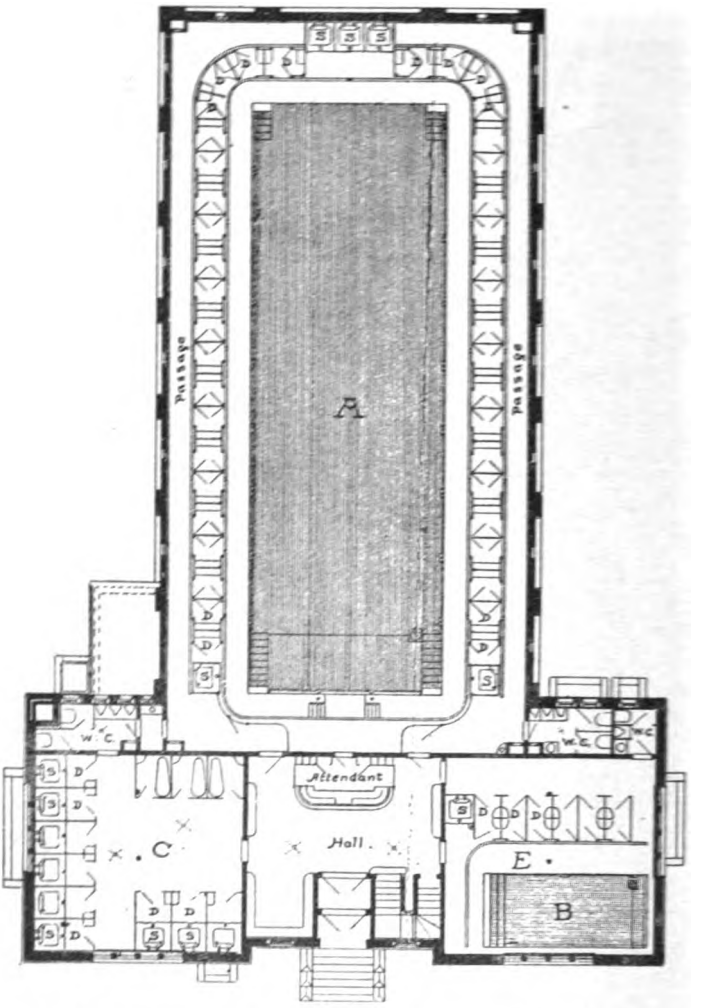
"Baths given in 1898 (288 days, closed 67 days, including holidays, Sundays and for repairs):

To males, 96,461; females 12,461; total	108,922
Cost of maintenance, (including wages)	$4,040 31
Average cost per bath given	0 $03\frac{7}{10}$
Daily average of baths given	374"

Two more baths, one with two swimming pools, have since been built.

The bath built by the town of Brookline, Mass., is a most remarkable example of public spirit. This town with a population of less than 20,000, built a public bath at a cost of about $43,000, exclusive of land. It was opened in January, 1897.

"The main part of the building contains the natatorium, spectators' gallery, running track and dressing rooms, and is well lighted, well ventilated, and commodious. The main tank is 80 feet long and 26 feet wide, and has an average of 4 1-2 feet of water. The bottom of the tank slopes gradually, and is four feet deep at one end and seven feet at the other. Around the swimming hall are forty-two dressing



A, Swimming Bath. B, Plunge Bath. C, Private Baths.
E, Swimming School. D, Dressing Rooms. S, Rain Baths.

FIG. 112.

Ground Plan of Bath-house, Brookline. From a plate loaned by the Committee on the Public Bath.

A second free public bath house to cost $15,000 is now under construction in the Polish tenement district, on land which cost $2,600.

Yonkers built a bath in 1897, at a cost of $9,400, exclusive of land. There are twenty shower baths and two tub baths. The building is of brick, 25 by 53 feet. Five cents is charged for towel and soap. Another bath has since been constructed. In 1899 there were 22,989 bathers,

16,648 male, 6,541 female. The operating expenses were about $2,600.

The bath in Rochester was open 27 July, 1899. It cost $15,028 including land. When purchased it was a dwelling house and $4,700 of the above was used in altering it and fitting it up. There are seventeen baths, and a place where bathers can wash their shirts and have them dry while bathing. No fee is charged and soap and towels are furnished. The operating expenses are about $3,500 per year.

FIG. 113.

Dover Street Bath, Boston. From a plate loaned by the Commissioners of Baths.

The Dover Street bath in Boston, was opened 14 October, 1899. It cost $86,000, of which $14,154.25 was for land.

"The building is a simple but imposing structure 43 feet wide by 110 feet deep. . . . On the first floor are separate waiting rooms for men and women with the laundry and engine room in the rear. On the second floor are separate bath rooms for men and women. The third floor in the front part of the building contains an apartment for the manager of the baths and his family. . . . There are thirty sprays and three tubs for men, and eleven sprays and six tubs for women. All the baths are enclosed. Each shower cabin contains a dressing alcove, with seat. A Gegenstrom apparatus is used."

A charge of one cent is made for towels and soap, but the bathers may bring them if they prefer.

There are two public baths in Milwaukee with large swimming pools. The one on the south side cost $24,363.36. In 1899 the operating expenses were $4,270.49, and 172,061 bathers were accommodated. The west side bath cost $23,135.89. In 1899 the operating expenses were $4,755.66 and the number of bathers was 191,245.

Newark has two public baths which cost together about $15,000, and proposes to build another at a cost of $7,200.

"The pools are about 18 by 60 in size; the baths are heated by steam from boilers to a certain temperature both in summer and winter; only one of these bath houses is used in winter, and is heated by steam; in one house there are eight shower baths. Outlet and inlet pipes for the pools are running continually, thereby allowing all scum and filth that might collect on the top of the water to run off; a portion of the water is run off every day and the baths are emptied and thoroughly cleansed twice a week; the use of soap is not allowed in the pools; there are sixty small lockers for the use of those persons wishing a private place to disrobe, five cents being charged for the use of them, including towels and tights; the baths are open two days in the week for women and the remainder for men."[1]

It cost in 1899 to operate the two baths for salaries $5,085.25, for coal $776.50, for incidentals $284.64. A superintendent and assistant, a fireman and a matron are required for each bath. The receipts for the use of rooms and suits which are hired at the option of the bather was $300. The attendance in 1899 was 100,039 males and 15,086 females.

Control of Barbers.

Five states, Michigan,[2] Minnesota,[3] Missouri,[4] Nebraska,[5] and Oregon,[6] have recently attempted to regulate the barber's trade by statutes enacted ostensibly for the protection of the public health, but it is to be feared intended rather to strengthen the trade. All of these acts provide for a state licensing board to examine candidates and issue licenses.

[1] Letter from the Health Officer of Newark, 24 February, 1900.

[2] Michigan, Chapter 212 of 1899.

[3] Minnesota, Chapter 186 of 1897.

[4] Missouri, Act of 5 May, 1899.

[5] Nebraska, Chapter 53 of 1899.

[6] Oregon, Act of 23 February, 1899.

These boards are to be appointed by the governor, except in Nebraska, where the board consists of the governor, attorney general, and auditor, and in Missouri the appointees must be examined by the state board of health and approved by it. In Nebraska the board appoints two barbers as secretaries who do the examining. In Missouri the law only applies to cities of over 50,000 inhabitants. The members of the board receive three dollars per day for actual services and their expenses. In Nebraska each applicant is to pay the secretaries five dollars. All persons acting as barbers at the time of the passage of the act can receive a license on payment of one dollar, and all others must pass an examination and must be free from contagious or infectious disease. In Missouri and Nebraska the barbers must conduct their business in accordance with rules to be made by the state board of examiners for barbers, which rules must be approved by the state board of health. In Oregon[1] barbers are required to disinfect their tools.

The Michigan law has been sustained by the supreme court.[2]

At a meeting of the board of health of Boston, 4 May, 1900, the regulation respecting barber shops shown below was adopted under the general sanitary authority granted the board.[3]

Gas Fitting.

The Boston board of health found that leaky gas pipes in dwellings are very common, occurring in as many as eighty-nine per cent. of the dwellings in that city.[4] Rightly believing that such leaks are more

[1] Oregon, Act of 23 February, 1899, Sec 12:

"Any person who shaves another person afflicted with syphilis, eczema, blood poison or any skin disease, who does not before he again uses his tools, towels, or water, subject them to such disinfection as may remove any virus, scale, or filth that may be on such tools, towels, or instruments, shall be guilty of a misdemeanor, and upon conviction thereof be punished by a fine of not less than ($20) twenty dollars nor more than ($50) fifty dollars, or by imprisonment in the county jail not less than ten days nor more than twenty-five days, or by both fine and imprisonment."

[2] N. W. Reporter 82, p. 234, Wass *vs.* Michigan Board of Examiners for Barbers.

[3] "The place of business, together with all the furniture, shall be kept, at all times, in a cleanly condition.

"Mugs, shaving brushes, and razors shall be sterilized by immersion in boiling water after every separate use thereof.

"A separate, clean towel shall be used for each person.

"Alum, or other material, used to stop the flow of blood shall be so used only in powdered form, and applied on a towel.

"The use of powder-puffs is prohibited.

"The use of sponges is prohibited.

"Every barber shop shall be provided with running hot and cold water.

"No person shall be allowed to use any barber shop as a dormitory.

"Every barber shall cleanse his hands thoroughly immediately after serving each customer."

[4] Boston, Report of Board of Health (1897), p. 50.

liable to do harm than is leaky plumbing. application was made to the legislature and an act secured which authorized the examination and licensing of gas fitters in Boston.[1] This act is patterned after the plumbing act, and provides for the appointment of a board of examiners to consist of the building commissioner, the chairman of the board of health, and a gas fitter of five years' experience to be appointed by the board of health. The last named member is to receive five dollars per day for his services. Both master and journeymen gas fitters must be examined and licensed, the former paying two dollars, and the latter fifty cents. The licenses are good until revoked. New work must be done under the supervision and with the approval of the building commissioner. The law contains certain requirements as to the cutting of timbers and the location of brackets, but other rules governing the work are to be made by the board of health and building commissioner. The board of health is to inspect and order changes in old gas-fittings. In 1898 of 400 applicants for gas fitters' licenses, 258 were rejected for failure to pass the examination.

Lying-in Hospitals.

Both Massachusetts[2] and Pennsylvania[3] have enacted laws for the regulation of lying-in hospitals under the direction of the health officials. In Massachusetts the licenses are issued by the selectmen on the approval of the board of health, but in Pennsylvania the license is issued by the board of health, and the application must be endorsed by six citizens. The license is for two years. In Philadelphia the board of health have made rules for these hospitals.[4] They must be inspected every month and must keep a record in the form prescribed by the board of health, of all cases, and must within five days report each birth to the board of health, and must also report when the child is removed from the hospital. In Boston in 1898 sixteen lying-in hospitals were licensed, and in them there were 376 confinements.

Baby Farms.

Massachusetts,[5] Rhode Island,[6] Connecticut,[7] and New York,[8] have enacted laws "for the protection of infants" who are placed out to board. In Rhode Island and New York the persons who are to receive

[1] Massachusetts, Chapter 265 of 1897.

[2] Massachusetts, Public Statutes (1882), Chapter 80, Secs. 56–69.

[3] Pennsylvania, Act of 26 April, 1893.

[4] Philadelphia, Rules of the Board of Health (1895), Secs. 112–115.

[5] Massachusetts, Public Statutes (1882), Chapter 80, Secs. 60–1.

[6] Rhode Island, Chapter 464 of the Public Laws (20 May, 1897.)

[7] Connecticut, General Statutes (1888), Secs. 2610–11.

[8] New York, Revised Statutes (1896), Public Health Laws, Sec. 26.

infants to board must first be licensed. In New York the license is to be issued by the board of health or the mayor, and in Rhode Island by the state board of charities, but it must first be approved by the board of health of the town or city in which the applicant resides. In Rhode Island the application must also be approved by two citizens. In Connecticut and Massachusetts the law does not require a license, but the person who receives the infants to board must make report to the selectmen in Connecticut, and to the board of health in Massachusetts. In Rhode Island the law is applicable to every one who takes a single child under two years of age, but in the other states it is only applicable to cases where two or more are taken, and the maximum limit of age is three years in Massachusetts and New York and ten years in Connecticut. The premises must be open to inspection by the board of health in Massachusetts, the society for the prevention of cruelty to children in New York, the town officers, state board of charities or Connecticut Humane Society in Connecticut, and in Rhode Island the health officer is required to inspect annually. In Rhode Island in 1899 thirty such licenses for children were issued of which thirteen were in Providence. Irresponsible baby farmers have by this law been pretty thoroughly suppressed in that city.

Prevention of Blindness.

Ophthalmologists have shown that a large proportion of blindness is due to the purulent infection of the eyes of infants at or soon after birth. Owing to the exertions of physicians interested in diseases of the eyes, laws intended to prevent this injury have been adopted in Connecticut, Michigan, New Jersey, Ohio, Pennsylvania, and Rhode Island.

The laws do not differ very much and are fairly represented by the one given below;[1] but in some of the laws as in New Jersey, the health officer is not to treat the child as in Pennsylvania, but has it placed in charge of a physician or the city physician. In New Jersey copies of the law are to be sent to physicians as well as nurses. In Rhode Island the nurse is to report to a physician.

[1] Pennsylvania, Chapter 263 of 1895:

"Section 1. Be it enacted, &c., That should one or both eyes of an infant become inflamed or swollen or reddened at any time within two weeks after birth, it shall be the duty of the midwife or nurse, or other person having the care of such infant, to report in writing, within six hours after the discovery thereof, to the health officer or legally qualified practitioner of the city, town or district in which the mother of the child resides, the fact that such inflammation or swelling or redness exists.

"Section 2. That it shall be the duty of said health officer, immediately upon receipt of said written report, to notify the parents or the person having charge of

Nursing Bottles.

The rubber tubes of long tube nursing bottles are difficult to clean and sterilize, and health officers and physicians have long opposed their use. But they are more convenient than the short nipple and hence are demanded by many mothers. Buffalo is the only city which has attempted to prevent their use. Dr. Wende, the energetic health officer of that city, has pretty thoroughly succeeded in enforcing the ordinance, though he met with strong opposition from some of the dealers.

Excursions for Sick Children.

No board of health has, so far as the writer knows, provided such excursions out of its own funds, but some have assisted private philanthropists in this work. In New York [illegible] the "summer corps" of physicians to the tenement poor distribute tickets to the excursions on the harbor of the [illegible] Island. In [illegible] of these tickets were thus distributed. In Lowell in [illegible] the board of health through private subscriptions was enabled to provide eight such excursions on the river, furnishing not only transportation but milk, ice, nursing bottles, and medical and other attendants. The amount expended was [illegible] and [illegible] children were taken on the excursions.

Protection of Working Children.

The state of New York, like many others, has laws for the protection of children who are put to work at too early an age. Unlike most of the laws, that of New York puts upon the health department a large part of the administrative work connected with the enforcement of the act. According to Chapter 41[illegible] of 1897, Sects. [illegible]:

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said infant of the danger to the eye or eyes of said infant by reason of said condition from neglect of proper treatment of the same, and he shall also enclose to them directions for the proper treatment thereof.

[illegible] Every health officer shall furnish a copy of this act to each person who is known to him to act as midwife or nurse in the city or town for which such health officer is appointed, and the Secretary of State shall cause a sufficient number of copies of this act to be printed and supply the same to such health officers on application.

[illegible] Any failure to comply with the provisions of this act shall be punishable by fine not to exceed two hundred dollars, or imprisonment not to exceed thirty days, or both."

[illegible] Buffalo, Ordinances, Chapter [illegible], Sec. [illegible].

"And it shall be unlawful for any person or persons to use or to engage in the sale of any bottle, the manist, or other device for the artificial feeding or nursing of infants or children under three years of age, that has connected therewith a rubber tube, hose or similar contrivance."

[illegible] Lowell, Report of Board of Health (1897), pp. [illegible] and [illegible].

"A child under the age of fourteen years shall not be employed in any mercantile establishment, except that a child upwards of twelve years of age may be employed therein during the vacation of the public schools of the city or district where such establishment is situated. No child under the age of sixteen years shall be employed in any mercantile establishment, unless such child shall produce a certificate issued as provided in this article, to be filed in the office of such establishment.

"Certificate for employment; how issued. — Such certificate shall be issued by the executive officer of the board, department or commissioner of health of the city, town or village, where such child resides or is to be employed, or by such other officer thereof as may be designated, by resolution for that purpose, upon the application of the child desiring such employment."

At the time of making the application the child's parents must file an affidavit as to its age, and the certificate is not to be issued by the health officer unless he is satisfied that the child is of the age stated and is physically able to do the work. A certificate of school attendance must be furnished by the school which the child has attended. The forms used for this work in the City of New York are shown in Appendices 125–6.

Certain exemptions are made for work during the Christmas holidays and for this "vacation certificates" are granted. This same act provides for water-closets and wash rooms for women and children. Seats must be provided for female employees and women and children shall not be employed in a basement except with the permission of the health department. All these provisions are to be enforced by this department.

Institutions for Children.

In New York in 1886[1] an act was passed which was amended in 1893 and which was intended to provide for the better care of all institutions, receiving dependent children. This law[2] provides for monthly reports to the board of health, and also provides that when the board of health finds "anything therein dangerous to life or health" it shall "cause the evil to be remedied without delay." The beds must be two feet apart and there must be 600 cubic feet of air space for each bed. In New York City[3] this law has not been a dead letter but the institutions have been under a constant supervision, a medical inspector being detailed to inspect them. In this way great improvements have been made in plumbing, ventilation, heating, bathing, dietaries, etc., and in every way the condition of the children is far better than before. As unlimited visiting by parents and friends was found to be a fertile source of communicable disease; this has been limited to monthly visit-

[1] New York, Chapter 633 of 1886.

[2] New York, Revised Statutes (1896), p. 2418 (Public Health Law, Secs. 203–6).

[3] New York City, Report of Department of Health (1896), p. 363.

to become nuisances, it is in some cities thought best to place the health department in charge of them. This is done in Cambridge, Lawrence, Providence, and in Boston until 1898. In most instances these urinals are simply iron affairs which are supposed to be kept clean by running water, but unless very carefully looked after, they are more or less offensive and filthy.

Decent urinals and decent water-closets are rarely provided at public expense in American cities and the public are forced to rely upon the facilities furnished by hotels, restaurants, railroad stations, and public institutions. Boston and New York are notable exceptions, for these cities have built and maintained in good condition, first-class toilet rooms for both men and women.

Sick Poor.

The care of the sick poor is in a number of cities wholly or partially in the charge of the health department. In most cases it is the care of the out poor or dispensary work which is given to the health department. In rarer instances this department manages the public general hospitals.

There are excellent reasons why the care of the sick poor at their homes or in dispensaries should be a part of health department work. Almost invariably medical men are in control of this department and are thus better fitted to select physicians to the poor, and to supervise their work than are laymen. Then, too, the work of poor physicians is such that they can do much to assist the health department in regard to vaccinations, communicable diseases, investigation of causes of death and nuisances. Whatever may be said in favor of such an arrangement, it has not been adopted in most cities.[1] But in Ohio[2] the board of health is authorized by statute to "appoint as many ward or district physicians as it may be deemed necessary for the care of the sick poor."

In most of the cities named below there are several district physicians appointed to care for the sick poor in their districts. These physicians are usually required to live in their districts and to have certain office hours. They are often required to keep records of their cases and to make monthly or weekly reports. Specific rules for their guidance are to be found in Cleveland[3] and Cincinnati,[4] and the District of

[1] "It has, however, been in Buffalo, Colorado Springs, Cleveland, Cincinnati, Charleston, District of Columbia, Denver, the larger Indiana cities, Kansas City, Jersey City, Knoxville, Memphis, Newark, Richmond, San Francisco, St. Louis, and Savannah."

[2] Ohio, Annotated Statutes (1900), Secs. 2115 and 2135.

[3] Cleveland, Rules of the Health Division, Department of Police, Rule 5.

[4] Cincinnati, Manual of Department of Health (1898), Sec. 281.

Columbia has excellent printed instructions. In a number of cities, as Colorado Springs, Cleveland, and Memphis, the district physicians are required to give medical attendance in police stations or jails. In Colorado Springs, Cleveland, Cincinnati, and Kansas City, they are to perform the public vaccinations. In Cincinnati the district physicians perform certain sanitary work in regard to the control of communicable disease and the report of nuisances. In that city the health officer has monthly conferences of these physicians at which the details of their work and public health matters are discussed. The following shows the number of physicians employed in several cities:

Year.	City.	Number of Physicians.
1897	Buffalo	8
1898	Cleveland	12
1898	Cincinnati	21
1899	Charleston	6
1898	District of Columbia	22
1898	Jersey City	8
1898	Kansas City	2
1897	Newark	11
1898	Richmond	4
1896	Savannah	4
1896	Toledo	5
1899	Troy	5

In Colorado Springs, Knoxville, and Memphis there is only one physician to look after the out patient poor. In Memphis this is the secretary of the board of health. In Spokane the health officer is to visit the sick poor. The salary of the physicians to the poor varies from $29.16 per annum in Toledo, to $850 in Charleston. It is $300 in Cleveland and Cincinnati, $360 in the District of Columbia, and $400 in Newark. The number of visits made by the city physicians upon the poor in their homes seems to vary greatly in different cities. This doubtless depends upon the character of the population, the care with which patients able to pay are sifted out, and the amount of aid furnished by private charities:

Year.	City.	Consultations.	Patients.
1899.	Charleston	—	32,087
1898.	Cincinnati	18,212	5,314
1899.	District of Columbia	20,025	7,583
1899.	Indianapolis	—	21,611
1898.	Jersey City	3,118	1,641
1898.	Kansas City	23,065	—
1898.	Memphis	—	4,949
1899.	Newark	—	30,160
1899.	Richmond, Va	21,896	4,700

Some cities, instead of requiring the district physicians to receive patients at their offices, establish, under control of the health depart-

efficient, he would probably at his own expense and by his own efforts, collect such a library; but with the uncertain tenure of office which prevails, it is rare that the health officer deems it worth while by study to make himself better fitted for his office. Not only are standard works and text books useful in such a library, but reports of work done in other cities and states should form an important part of it. Much can be learned from both successes and failures of others. Here again the constant changes in health officials makes it difficult to keep up files of reports. Nevertheless, some cities do attempt to maintain a library and accounts of such may be found in the reports of St. Louis,[1] District of Columbia, and Minneapolis. In St. Louis an index has been kept of the contents of various reports received and placed in the library. This index is not as full as it might be, but is a move in the right direction, and it would be well if organized effort could be made to index all sanitary reports.

Advancement of Knowledge.

It is the duty of every physician and of every health officer to take advantage of each opportunity that may offer to add his mite to the sum of human knowledge. Such duty is not confined to men of scientific pursuits, but is incumbent upon every one; but the scientific man is daily making use of the cumulative studies of thousands of his predecessors without which his own work would be impossible, he well knows how inestimable may be the value of a single new fact discovered, and he is constantly seeing new lines of investigation invite his labors. He must indeed be a selfish man who would freely receive from others the priceless legacy of modern science and make no effort to show his gratitude in the only way he can show it, by striving to increase the sum of human knowledge for the benefit of those who are to come after.

In one sense this effort to advance the science of sanitation is by far the most important work that the health officer can do. It was a far more useful thing for the members of the New York health department to show how to make a concentrated antitoxin than it would be to tear down a hundred tenements or to disinfect a thousand houses; and for the Massachusetts board of health to show the world how to filter water and sewage is ten fold more important than all the routine work ever done by that board, useful enough though the latter has been.

With some truth it may be said that the municipal health officer does not have the opportunity or the time for investigation, and that

[1] St. Louis, Report of Health Department (1895-6), p. 261.

such work had best be done by the federal or state governments or by the universities. Original research certainly would be a leading function of a national board of health if we had one, and is made an important part of the work of many state boards. It is also true that certain lines of investigation which are of a general character do not belong to the work of the local health officer. The study of filtration as pursued in Massachusetts, properly belongs to a state board. Yet sometimes even cities may be forced to undertake work of this nature. Because a certain method of filtration had not been studied at Lawrence (chiefly from lack of opportunity), municipal investigation became necessary at Providence, Louisville, Cincinnati, and Pittsburgh. So the work of the New York board of health on vaccine virus and antitoxin might have been expected of a state board of health or a university, but was undertaken by a local board because no one else would do it: but there are certain lines of investigation which can be best followed by local health officers. Problems connected with the mechanism of the spread of communicable disease can be best studied by those who can personally follow the history of many cases. The relation between defective plumbing and sickness, or between privy vaults and the spread of typhoid fever is to be learned best by the man who has charge of the inspections. The local health officer can alone determine the necessity for disinfection and the value of methods proposed. He can best determine the degree and duration of the immunity conferred by vaccine or antitoxin.

Every one cannot expect to make a great discovery, and to solve completely an important problem need not be one's aim. Facts carefully recorded and carefully published are always useful and may become invaluable. Much of the routine work of the municipal health department may be done in such a way as to give it a permanent usefulness, or it may be done in such away that its momentary value is its only value. Care and thought applied to the recording of all work done should be a health officer's first duty. Reliable data in regard to garbage cremation are hard to find in this country, but if every city which operates a crematory had kept and published the work of the crematory as carefully as was done in Lowell for several years, a very correct estimate of the cost of construction and operation might by this time have been available.

Many health officials have done work for the advancement of knowledge. The recording of vital statistics and cases of sickness is such work. Most local officers do not do much in this direction besides record the bare number of cases and deaths from different diseases. Tabulation is left for those who handle larger masses of

figures, as the state registrars. In some local reports, especially in those cities where registration was established before it was required by statute, the causes of death are subjected to a more or less extensive analysis as in Baltimore, Boston, Charleston, District of Columbia, New York, Philadelphia, Providence, St. Louis, and San Francisco. The most elaborate tables are those of Providence which were begun in 1855 by Dr. E. M. Snow who was the first health officer and registrar.

A good many cities have carefully inspected the sanitary condition of all houses where communicable disease is reported. Some few health officers have analyzed the results of these inspections. Among cities where this has been done is Boston. Investigations in Boston have shown that scarlet fever and diphtheria are as likely to occur in clean houses and houses free from defective plumbing and sewer gas as they are in houses where these conditions are found. Furthermore, such unsanitary conditions are shown by house to house inspection to be as common in those houses where the diseases in question are not, as they are in houses where these diseases exist. In a word, it is shown by most excellent statistical evidence that there is no causative relation between unsanitary conditions and scarlet fever and diphtheria. Unfortunately, the Boston board of health has not seen fit to publish the details of its investigations, but merely its conclusions.

The record of communicable diseases and as many facts concerning location, exposure, duration, number in family and house, extension of infection to others, etc., is of great scientific importance; but it is equally important that the results of such investigations should be published. It is an excellent thing to plat each case of communicable disease on a map, but it is more important to study the map when made and during its making. Thus only could the board of health of New York City determine the important fact that phthisis is more prevalent in some houses than in others, and that some houses seem to be thoroughly infected. In Providence by a careful study of the cases occurring in tenement houses it was learned that scarlet fever and diphtheria do not spread in such houses more than in neighboring houses, and that children, except in the infected family, may safely be allowed in school. If every health officer would record and publish every case where a well person apparently carried a communicable disease to another, every instance where there was a recurrence after disinfection, and every instance where the patient remained infectious for a long period, as shown by his infecting others, much light would soon be shed on the very serious problems which are troubling the health officer.

The value of methods of disinfection can best be tested in routine

work. It may be done by exposing bacteria in the rooms or in the goods to be disinfected. Such work has been done in a number of cities, as Asbury Park, Boston, Chicago, Concord, Fitchburg, Newton, Pittsburgh, and Providence. Some of the most valuable of these experiments have been carried on at Boston in connection with formaldehyde disinfection. The methods employed are shown in the report for 1898, page ninety-one, and 1899, page eighty-three. In Pittsburgh a test culture is put in every room disinfected and the results are published, but unfortunately the methods employed are not fully given.

The investigation of local outbreaks of communicable disease is a duty which should be faithfully performed by every health officer. He must keep careful watch of his returns and when any unusual increase occurs he should seek out its cause and if necessary should call in expert assistance. Many examples of such investigations may be found in municipal reports, as for example, New Haven, 1896; Boston, 1892; Providence, 1888; New Bedford, 1893; Springfield, Mass., 1892; Manchester, N. H., 1894; Syracuse, 1892; Burlington, Vt., 1895; District of Columbia, 1895; Worcester, 1894; Montclair, N. J., 1897; Paterson, 1892–1893; Minneapolis, 1893. The above are, of course, only a few of the cases where the origin of an outbreak has been studied by local health officers.

The establishment and maintenance of laboratories gives a fine opportunity for scientific work under the direction of the health officer. The chemist is employed to test water, milk, and other foods and to detect impurities and adulterations, but he ought to do more than mere routine work. If his analyses are carefully recorded, summarized, and published he cannot help doing something for the advancement of science, even if he makes no brilliant discovery. But the bacteriologist has the widest range of problems clearly mapped out for him. Only the larger laboratories like those of Boston, Chicago, and Philadelphia, and especially New York, can be expected to take up systematically the newer problems of pathology. The New York laboratory with its exceptional facilities has been able to accomplish much, both of practical and theoretical importance: but certain problems can be and should be attacked in every laboratory. Tests of disinfection, investigations of the distribution among the well, and outside of the body, of the specific organisms of typhoid, diphtheria, and tuberculosis, their persistence in each individual, and their virulence under varying conditions, give promise of furnishing the greatest aid in developing a scheme for the management of these diseases. Unfortunately, very little has yet been done along these lines. The investigation of the connection between malaria and the mosquito can well be taken up by health officials.

The thorough and systematic inspection of schoolhouses before referred to, is an example of good scientific work. So is the examination of springs, ice, and water supplies. In this connection may be mentioned the fifteen wells in Asbury Park in which for many years the height of the ground water has been noted at stated intervals. It is a good thing to distribute pasteurized milk, but it is a better thing to follow the lives of the children to whom it is given and show that the practice saves lives.

A leading educator has been quoted as saying that the first duty of a school superintendent is to secure the aid of the local press. There is no doubt that the health officer can do much to secure the advancement of sanitation if he can gain the hearty coöperation of the newspapers. Judgment and tact here count for much and the health officer should always advertise his department, not himself.

Another method of teaching the public is by means of circulars of information. Many of these circulars have been referred to and examples given. Circulars in regard to the various communicable diseases, in regard to disinfection and vaccination and the care of infants, are distributed in nearly every city. Before plumbing laws were so generally enacted, circulars in regard to good plumbing were often sent out. The establishment of bacteriological laboratories necessitates the issusing of explanations of the purposes of the laboratory and directions how to make use of its facilities. The passage of new laws, or the adoption of new methods along any line of sanitary work, render it advisable to issue an explanatory notice which may be sent to the parties most interested, or in some cases to the general public. It is often unwise to rely upon the educational effect of a single issue, but it should be repeated from time to time. It is often necessary to print circulars of information in several languages. State boards of health as a rule, provide more thoroughly for this educational work than do local boards. They have to instruct local boards as well as the public and their circulars of information cover a wider range of subjects. Examples of circulars for the care of infants are shown in Appendices 123–4.

Many cities issue weekly or montly reports by their health officials. Among those which issue the former may be mentioned: Baltimore, Charleston, Philadelphia, Pittsburgh, and New York City. Monthly reports are issued in Brockton, Buffalo, Chatanooga, Chicago, Cleveland, Detroit, Evansville, Fitchburg, Hartford, Houston, Knoxville, Lawrence, Lincoln, Los Angeles, Cal., Lynn, Macon, Ga., Manchester, N. H., Milwaukee, New Haven, New Orleans, Oakland, Cal., Omaha, Paterson, Portland, Ore., Rochester, Sacramento, San Diego, Scranton,

Seattle, and Yonkers. These reports are of every conceivable form and size from a postal card to the monthly report of the San Francisco board of health which is 9½ by 11½ inches and contains twenty-seven pages. These sheets would be exceedingly annoying to file if any one thought it worth while to attempt it. Most of these weekly and monthly reports contain merely vital statistics. Scarcely any two are arranged alike, and they are useless for purposes of comparison. The writer believes they are useless for any purpose. As was stated elsewhere, the monthly report issued in Providence was discontinued by the writer and its value was indicated by the fact that only one person afterwards wrote to inquire about it. It was a report above the average in quality as the writer is free to say, as it was entirely the work of his predecessor. Some of the monthly reports include other items beside those of vital statistics, such as reports of communicable disease, nuisances, plumbing, market and milk inspections, disinfections, garbage collections, scavenger work, meteorological reports, and sick poor reports, reports of chemical and bacteriological work, lists of sanitary officials, and in some cities general municipal statistics are included. In fact everything that should properly be included in a complete report of health department work may sometimes be found on these ephemeral reports. Even the results of original scientific investigations are sometimes included as in Buffalo and Chicago. Usually only the mere statement of work done is made without any explanation. It is difficult to find two reports that are alike either in form, subject matter, or arrangement. Some cities, as Chicago, Buffalo, and Omaha, have published no other reports for several years. The writer looks upon these reports as an insufferable nuisance. They are extremely unsatisfactory. If a person desires to know what is done in his own or another city he will never learn from a monthly health report. The proper time division for the consideration of all sanitary matters is a year, not a month or a week. It matters little how the deaths from influenza this week compare with the week before last, or how many loads of garbage were collected in August as compared with January. Annual compilations only are useful, and furthermore, a mere numerical statement of facts without any text is of little use to any one. Even if a person should take any interest in the monthly reports, as the writer has done in those of Chicago and Buffalo simply because annual reports were not available, he would find difficulty in keeping files of them as they are mailed as second class matter, and a considerable number are sure to be cast into the waste basket together with the advertisements of patent disinfectants, etc., which they are made to resemble by the one-cent postage stamp which is affixed to them. If the money that is spent in printing

and mailing these ephemeral sheets were spent in publishing or strengthening an annual report, it would be a distinct advantage.

Annual reports should present a summary of the work done by the health department during the year, with the necessary explanation and discussion of the same, and also suggestions for desired improvements. These reports are issued first to serve as an official record of work done, second to give information concerning this work to all members of the city government and to the citizens, and third to furnish information to the officials and citizens of other cities. The last is a function which is not recognized as legitimate by the average councilman. He calls it a waste of money to print a report which may be useful to others. He sees nothing dishonest in taking all the information he can get from others and giving nothing in return; but whether a report is intended for use in the city of its publication or in other cities, its form and contents should be the same.

All municipal documents should be of uniform size, and all cities should adopt the same size. Most cities have adopted the octavo, but there are a few exceptions. Reports sent by mail should never be rolled. An envelope costs no more than a wrapper, and takes less time. Reports should have the different subjects arranged in the same way year by year. It is then much easier to find what is wanted. All publications of fifty pages and over should have an index, or at least a table of contents. Some quite bulky reports, as those of Baltimore, Milwaukee, and Philadelphia, are without this.

Certain municipal statistics should be included, as the population, area, parks, streets, sewer connections, vaults, wells, houses, tenements, etc. A large number of health departments include registration among their duties, and such departments usually include vital statistics in their reports, though sometimes, as in Providence, a separate registration report is issued. If a full report of births, marriages, and deaths is not included in an annual report, at least the total number of deaths should be given and the death rate and the deaths from the more important diseases, particularly the communicable diseases. These details should be given for a number of years. In fact, nearly all the facts given in numerical form in the report should be in tables including a series of years. This is equally important and valuable for the health officer who makes the report, the members of the council or the mayor to whom it is made, the citizen who pays for it, and the worker in the other cities. If it is objected that it makes the report too large and expensive, it may be remarked that money may be saved by discontinuing the monthly sheet. A perusal of many reports will show padding in the form of general remarks (often quoted) on sanitary subjects,

which might well be omitted in favor of the summaries. It is a good plan to give in the first part of the report a list of the officers of the department. Whoever opens the report at all will probably be interested in this. It is found in most reports, but not in those of Boston, the District of Columbia, Denver, Philadelphia, and a number of smaller cities. A statement of the expenses of the health department should be made. This should be given in some detail showing the amounts expended for salaries, for hospital expenses, ambulances, vaccination, disinfection, carriage hire, office expenses, removal of ashes, garbage or night soil, registration and laboratory expenses. If any of these matters, which are usually in the health department, happen to be in another department, it would be well to note this and also the amount expended by that department. It is sometimes deemed inadvisable to publish salaries, but it is usually best to do so, and a good way to give the expense items of the health department is to state that so much was spent for such and such a department, as plumbing inspection, and then under that specify the salaries of the inspectors.

Two faults are frequently found in financial statements. One is that little or no detail is given, the other is that too much is given. It is important to know just how much it cost to remove so many tons of garbage, but not that John Smith was paid $75 for a horse, and John Doe ninety-seven cents for a whip.

In reporting the working of the department each year it is not practicable to go into details in regard to everything which is done where the same methods are followed year by year, but it is a good plan to have such a complete account in at least one report, and refer to it by year and page in those subsequently issued. New methods and new investigations should always be explained in the clearest possible manner.

Statistics of communicable disease should be made as full as possible and should cover a number of years. It is of advantage to give them by months but it should not be forgotten that the totals should be given also. In some reports the only way the reader can get totals is to add the columns. The annual rate per 10,000 of the population is also desirable. It should be made clear whether croup is included with diphtheria or not. Nearly every health officer is in a position to secure antitoxin statistics, and they should be published as carefully as possible. Immunization statistics are particularly desirable. Special cases throwing light on disputed points concerning the period of incubation or infection, or concerning the manner of infection should be reported in full. At the present time accurate accounts of disinfection are very desirable. The collection and disposal of garbage and other

refuse should receive careful attention. The manner in which the work is done, the amounts handled and the cost should be clearly indicated. It is very unsatisfactory to read of loads of garbage without knowing how large the loads are, and the cost of collection should, if possible, always be separated from that of disposal. Laboratory work should be reported in detail, and methods, particularly if they are new ones, fully described.

It may be objected that this plea for comprehensive reports made by the writer is due simply to his own personal need for such reports while preparing the foregoing pages; but it is not alone the student of municipal affairs that desires good reports. The average citizen who desires to look into the workings of a department, the councilman or mayor to whom the reports are technically made, or the health officer in another city, all desire that a report which they take up shall tell them what is done, and how it is done, and shall convey this knowledge clearly and fully, taking nothing for granted.

FINANCES.

The appropriation available for most health departments is entirely dependent upon the will of the council or other appropriating body. Much or little may be given as seems fit. Sometimes the amount is specifically divided by the act of appropriation, so much being set aside for salaries, so much for hospital expenses, so much for the disposal of garbage, etc. In other cases the particular use which is to be made of the appropriation is left entirely to the board of health, but of course, subject to the ordinances. The latter plan is followed in the city of the writer and he sees no reason to desire a change, but members of health boards in other cities have spoken to him of the disadvantage of having the appropriation divided by outside officials who cannot possibly foresee all the exigencies that may arise.

Usually a council may withold all appropriation if it chooses, but some states have provided that the local sanitary administration shall each year have some available funds. In Iowa,[1] Ohio,[2] Wisconsin,[3] and Minnesota[4] it is provided that the expenses incurred under the provisions of the act providing for the establishment and operations of boards of health must be met. No attempt is made in the above states except in Minnesota to fix the amount available. In other states the

[1] Iowa, Code (1897), Sec. 2571.

[2] Ohio, Annotated Statutes (1900), Sec. 2140.

[3] Wisconsin, Statutes (1898), Sec. 1421.

[4] Minnesota, Statutes (1894), Sec. 7073.

amount is fixed, or at least the minimum. This is the case in Florida[1] and New Jersey.[2] In Florida where local health administration is in the hands of the state board of health that board may expend for sanitary purposes other than quarantine one-half mill on each dollar of the assessed valuation. In Minnesota the amount is one mill on each dollar. The New Jersey law allows the expenditure of $100 per annum for 2,000 inhabitants and an increase according to population. The law is given below.[3]

Several laws in these and other states make provisions for expenditures for specific purposes, as the care of communicable disease, maintenance of quarantine, building of hospitals, establishment of baths, licensing of plumbers, destruction of diseased animals, inspection of milk, etc.

It is extremely difficult if not impossible to prepare a comparative statement of the amounts expended for sanitary purposes in different cities. The following table is taken from the September *Bulletin of the Department of Labor* (1900). It is not definitely stated in this report, but it so appears from a study of the items, that expenditures for garbage and other refuse disposal and for hospitals for communicable diseases are not included, except where it is so specified. Other items such as expenditures for plumbing inspection, food inspection, for the care of the sick poor, for maritime quarantine, and for the recording of births, marriages, and deaths, are in some cities included and in others not. It was found impossible owing to lack of printed reports from many cities and to the unsatisfactory character of the reports of others to make the desired corrections. The table then must be considered as only a rough indication of the sanitary expenditures of the different cities.

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[1] Florida, Chapter 32 of 1899.

[2] New Jersey, Revised Statutes (1895), p. 1650, Sec. 86.

[3] New Jersey, Act of 31 March, 1887, Secs. 34–35:

"That the local board of health of each township in this state may expend annually the sum of one hundred dollars in the care of the public health, and in addition thereto fifty dollars for each one thousand of the inhabitants thereof over two thousand, as returned by the last preceding census, if in its judgment such expenditure shall be required for the purpose, and itemized bills for such expenditure, having been approved by the president and secretary of such board, shall be paid by the usual disbursing officer of the township, and if in case of any emergency or of any special need for the protection of the public health such board shall consider the expenditure of a greater sum necessary, the board shall so certify to the township committee, and with their consent and approval may incur such further expense as said committee may authorize, and if the funds at the disposal of the township committee are not sufficient to cover such expenditure, said committee is hereby authorized to borrow money for the purpose on the credit of the township, and is directed to place the amount in the next annual tax levy, and with the money so raised to pay the debts so incurred."

TABLE SHOWING THE EXPENDITURES FOR THE HEALTH DEPARTMENT IN CITIES OF OVER 30,000 INHABITANTS.

Bulletin of the Department of Labor, September, 1900.

New York, N. Y.	$1,070,546	Albany, N. Y.	$9,539
Chicago, Ill.	190,844[1]	Cambridge, Mass.	22,048
Philadelphia, Pa.	240,928	Portland, Ore.	4,121
St. Louis, Mo.	134,201	Atlanta, Ga.	103,779[5]
Boston, Mass.	145,021	Grand Rapids, Mich.	4,639
Baltimore, Md.	91,641	Dayton, O.	7,963
Cleveland, Ohio.	35,532	Richmond, Va.	67,469[5,6]
Buffalo, N. Y.	43,771	Nashville, Tenn.	7,322
San Francisco, Cal.	111,137	Seattle, Wash.	8,798
Cincinnati, O.	40,446	Hartford, Conn.	10,476
Pittsburgh, Pa.	81,507	Reading, Pa.	2,965
New Orleans, La.	26,250	Wilmington, Del.	7,701
Detroit, Mich.	38,079	Camden, N. J.	3,500
Milwaukee, Wis.	34,193	Trenton, N. J.	4,500
Washington, D. C.	44,054	Bridgeport, Conn.	4,000
Newark, N. J.	56,615	Lynn, Mass.	4,528
Jersey City, N. J.	7,766	Oakland, Cal.	10,446
Louisville, Ky.	9,638	Lawrence, Mass.	28,184
Minneapolis, Minn.	23,340	New Bedford, Mass.	5,513
Providence, R. I.	20,270	Des Moines, Ia.	6,360
Indianapolis, Ind.	10,000	Springfield, Mass.	6,801
Kansas City, Mo.	36,198[2]	Somerville, Mass.	8,079
St. Paul, Minn.	9,011	Troy, N. Y.	7,610[7]
Rochester, N. Y.	28,359	Hoboken, N. J.	2,332
Denver, Colo.	41,530	Evansville, Ind.	2,123
Toledo, Ohio.	14,895	Manchester, N. H.	4,594
Allegheny, Pa.	15,337	Utica, N. Y.	13,334
Columbus, O.	55,340	Peoria, Ill.	6,253
Worcester, Mass.	11,502	Charleston, S. C.	13,500
Syracuse, N. Y.	76,282	Savannah, Ga.	29,409
New Haven, Conn.	8,023	Salt Lake City, Utah.	12,202[4]
Paterson, N. J.	7,112	San Antonio, Tex.	12,347
Fall River, Mass.	23,619	Duluth, Minn.	6,419
St. Joseph, Mo.	6,478	Erie, Pa.	5,657
Omaha, Neb.	10,495[3]	Elizabeth, N. J.	4,560
Los Angeles, Cal.	36,456	Wilkesbarre, Pa.	2,674
Memphis, Tenn.	60,664[4]	Harrisburg, Pa.	4,126
Scranton, Pa.	7,700	Portland, Me.	3,125
Lowell, Mass.	40,820	Yonkers, N. Y.	10,175

[1] Not including data relating to sanitary district of Chicago.

[2] Including expenditures for hospitals.

[3] Including expenditures for hospitals, asylums, almshouses, and other charities.

[4] Including expenditures for garbage removal.

[5] Including expenditures for street cleaning and sprinkling and garbage removal.

[6] Including expenditures for cleaning sewers.

[7] Data for 10 months.

Norfolk, Va	[illegible]	Terre Haute, Ind.	[illegible]
Waterbury, Conn	[illegible]	Dubuque, Iowa	[illegible]
Holyoke, Mass	[illegible]	Quincy, Ill	[illegible]
Fort Wayne, Ind	[illegible]	South Bend, Ind	[illegible]
Youngstown	[illegible]	Salem, Mass	[illegible]
Houston, Tex	[illegible]	Johnstown, Pa	[illegible]
Covington, Ky	[illegible]	Allentown, Pa	[illegible]
Akron, O	[illegible]	Davenport, Ia	[illegible]
Dallas, Tex	[illegible]	McKeesport, Pa	[illegible]
Lancaster, Pa	[illegible]	Springfield, Ill	[illegible]
Lincoln, Neb	[illegible]	Chelsea, Mass	[illegible]
Brockton, Mass	[illegible]	Malden, Mass	[illegible]
Binghamton, N. Y	[illegible]	Topeka, Kans	[illegible]
Augusta, Ga	[illegible]	Sioux City, Ia	[illegible]
Altoona, Pa	[illegible]	Knoxville, Tenn	[illegible]
Wheeling, W. Va	[illegible]	Chattanooga, Tenn	[illegible]
Mobile, Ala	[illegible]	Superior, Wis	[illegible]
Birmingham, Ala	[illegible]	Rockford, Ill	[illegible]
Little Rock, Ark	[illegible]	Taunton, Mass	[illegible]
Springfield, O	[illegible]	Joliet, Ill	[illegible]
Galveston, Tex	[illegible]	Canton, Ohio	[illegible]
Tacoma, Wash	[illegible]	Butte, Mont	[illegible]
Haverhill, Mass	[illegible]	Auburn, N. Y	[illegible]
Spokane, Wash	[illegible]		

As illustrating sanitary expenditures in smaller communities reference may be had to the report of the state board of health of Ohio for 1[illegible]. The figures refer to incorporated villages mostly of 1,000 to 2,000 inhabitants. In two of these the sanitary expenditures were over $1,000; in one between $500 and $1,000; in seven between $250 and $500; in twenty-one between $100 and $250, and in 159 under $100. In most of them the chief item of expense was the salary of the health officer.

Tenement Houses

The housing of the poor is one of the most serious problems confronting large cities. The tenement house question is a pressing one with sanitarians as the death rate in tenement house districts is usually much higher than in other parts of the same city. It is believed that by improving the tenements, the conditions of life are improved and that the better environment conduces to the physical and moral well being of the occupants, and increases the amount of happiness and extends the duration of life. Tenement houses may be defined, and are so defined in laws dealing with the subject, as dwellings designed for a certain number of families. The popular notion of a tenement is a dwelling

[1] Expenditures for Brambleton and Atlantic City wards included in other expenditures for maintenance and operation.

[2] Including expenditures for street cleaning and sprinkling and garbage removal.

hired by the poor and usually cramped and dirty. To improve the condition of the tenement, both the popular and the legal tenement, has been one of the chief aims of sanitary officers.

All the laws against nuisances and the methods devised for their abatement, are largely put in operation for the benefit of dwellers in tenements, and the general building and plumbing laws, the operation of medical relief, and the care of contagious disease, have all done much to better the condition of the inhabitants of tenement houses.

Besides these general efforts, special attempts have been made directed specifically to the improvement of tenements. The necessity for such efforts varies greatly in different cities. It is greatest in the cities of the old world; that is in the older portions laid out irregularly with narrow streets and alleys. The regular plan and generous thoroughfares of most American cities have been of enormous advantage. The tenement question is as a rule the more important the larger the city. The smaller the city the less valuable the land, and the smaller the houses and the greater the space around them. Rapid growth sometimes, as in Chicago, has almost necessitated the occupation of many unsuitable buildings as dwellings. Lack of freedom to expand in all directions, as in Boston and New York, will also foster the tenement evil. In fine, crowding is what makes the houses of the poor a problem. In the country there is light and air for all, no matter how poor the dwelling. In the city, darkness and suffocation come, unless care is taken. The greater the demand for space the greater the crowding and resulting harm.

All the conditions of the tenement house evil were more actively in operation in New York than in any other city, and in New York the evil has in the past reached greater proportions than in any other city, has received more attention, and has had more done to eliminate it. The labor of improving tenement houses is so vast that it could hardly be expected that a board of health could accomplish much without outside assistance. As a matter of fact public opinion has been formed and legislation adopted largely by other agencies. Thus in New York City there have been four independent commissions appointed to consider this tenement problem, and to their reports and the public sentiment created by them has been due much of the improvement in the dwellings of the poor in that city. A fifth commission is at present (1900), considering the subject. The secretary of this commission, Mr. Lawrence Veiller, has recently (October, 1900,) issued a report on *Housing Conditions and Tenement Laws in Leading American Cities*, and to this report the writer is greatly indebted. The enforcement of tenement house laws when they are once enacted is usually left to the

department of health and can only be secured by it when backed by strong public opinion. The most important tenement house legislation is embodied in special acts passed to affect certain large cities as Boston,[1] Chicago, Cincinnati, Cleveland, New York,[2] and Philadelphia.[3] There have also been a few acts conferring upon local government the power to regulate the construction of tenement houses. Thus in New Hampshire[4] towns and villages, and in New Jersey local boards of health are authorized to do this, and a similar authority was given to Baltimore[5] though few ordinances have been adopted under its provisions. The ordinances governing the construction of tenements in Buffalo are adopted under the provisions of the charter which gives the power to regulate the construction of buildings.[6]

The earliest tenement house laws were enacted for New York City in 1867 and these serve as the basis of the present statutes. Various modifications of these laws have been made from time to time. The latest form is that found in the charter for the greater city.[7] The following is a brief synopsis of the sections with the exception of those relating to the vacation and destruction of houses unsuitable for occupancy which have been considered on page 140:

SEC. 1304. Tenements must be ventilated as required by the board of health.

1305. A tenement is defined as a dwelling leased to three or more families or more than two families on a floor; a lodging house is where persons for hire sleep for less than one week.

1306. Roofs must not leak and stairs and banisters must be kept in repair and means of escape from fire provided.

1307. Sleeping rooms if without a window must have a transom (of three square feet area), opening into a room with a window, and also a transom into a hall or room opening into a hall. There must be a ventilator over the stairway.

1308. Sewer connection must be made when there is a sewer, and vault or water closet provided. The owner must see that all plumbing is kept in good order and no filth must be put in an improper place. When there is no sewer there are strict rules about vaults, and yards must be drained into the gutter.

1309. Cellars in buildings hereafter erected are not to be used wholly or in part as a dwelling, and in old buildings they are not to be used as a dwelling without a permit. Cellars so used must be seven feet high, two feet above street, surrounded by two and one-half feet open space and drained, and have one foot of space below the floor. There must also be a window of nine square feet. If there is a rear room in the cellar, it must have a door and transom into the front room. Light must not be obstructed by steps or otherwise, and a water closet must be provided.

[1] Massachusetts, Chapters 419 of 1892, 97 of 1895, and 161 of 1899.

[2] New York, Chapter 378 of 1897, Secs. 1304–25.

[3] Pennsylvania, Act of 7 June, 1895.

[4] New Hampshire, Public Statutes (1891), Chapter 116.

[5] Maryland, Public Local Laws (1888), Vol I, p. 415, Secs. 400–1.

[6] New York, Chapter 105 of 1891, Title II., Chapter I, Sec. 17(5).

[7] New York, Chapter 378 of 1897, Title 7.

1310. No cellar can be used for sleeping without a permit. Wall paper must be taken off before new is put on. Owner, keeper or lessee must cleanse house whenever board of health requires.

1311. When part of a tenement is used for a bakery or bar room, transoms must be tight to keep out odors, and doors must be fire proof.

1312. There must be proper garbage and ash receptacles, no combustibles or hay or grain may be stored, and no animals kept. There must be no bakery unless the building is fire proof.

1313. Owners and persons having control must file name and address and description of property with board of health. In case of change, new owner must register in thirty days. Notices of the health department must be posted five days and mailed.

1314. Tenements are to be inspected twice a year. Contagious diseases must be reported by owner or occupant.

1315. Prescribes method of vacating tenements unfit for habitation.

1316. Provides for the condemnation and destruction of all such."

The following provisions are for new buildings:

1318. Two tenements cannot be erected on one lot without a permit from the department of buildings. If the buildings are one story high there must be a ten foot space between them; if two stories, fifteen feet; if three stories, twenty feet; if more than three stories, twenty-five feet; but if there is through ventilation, the space may, by permission, be less. The building is not to occupy more than 62 per cent. of the lot, except on corners, when 92 per cent. is allowed. Such building shall not come within five feet of the rear of the lot, and the interior shaft shall not be less than two feet four inches wide. No shaft over ten feet square shall be covered with a skylight. The cellar stairs must be fireproof. There must be an area in front from level of cellar. All elevator shafts must have automatic doors unless there is an attendant. The elevator well in cellar must be fireproof. In buildings of over five stories, the stairs must be fireproof, and of over three stories of slow burning construction with no wood wainscot. One flight must extend to roof. Every room must have a window into the open air. The water closet must open outside, or if it has its own vent shaft, may open into shaft if twenty-five feet square. The floor of water closet must be asphalted or otherwise water proofed, and it must be water proofed sixteen inches up the sides. The department of buildings may make further explanatory regulations. Tenements may not be used for a private school, stable, or for storing rags, but under written regulations, the board of health may give permit for a school. In cases of violation, any court of record may after notice, enjoin further use of building.

1319. In all new houses rooms must be eight feet high, except in attic where they must be eight feet for one-half their area. Every room shall have a window or a ventilator over door into a hall with window. Windows must have one-tenth area of room, and extend to seven and one-half feet above floor, and the upper half must open full width. Habitable rooms of less than 100 feet floor space, if not provided with window or fireplace, shall have separate air shaft as prescribed by the board of health.

1320. There must be a chimney opening for stove for each room and receptacles for rubbish and water on each floor. Cellars (of all houses) shall be made water tight and ceilings plastered, and in made land in wet places must be moisture proof. The board of health is to compel these changes to be made. Halls to have windows, unless ventilated otherwise to the satisfaction of the board of health. Hall lights must be kept from sunset to ten P. M., and in halls without windows from eight A. M. to ten P. M.

1321. Every adult occupant shall have 400 cubic feet of space and children under twelve, 300 feet. In a house for more than eight families, there shall be a resident janitor.

1322. The penalty for violations of the tenement house law is from $10 to $100 and $10 for each day of violation, and ten days imprisonment for each day of violation. The owner and lessee are responsible.

1323. Provides that the department of buildings may make other regulations as to light and ventilation of all new tenement or lodging houses consistent with the foregoing, when it shall be satisfied that such regulations will secure equally well the health and safety of the occupants; likewise the board of health shall have authority to make other regulations as to cellars and as to ventilation in completed buildings, consistent with the foregoing, when it shall be satisfied that such regulations will secure equally well the health of the occupants.

1324. Provides for inspection by sanitary police.

The New York law has served as the basis of tenement house legislation throughout the country. Several cities have incorporated more or less of it into their sanitary codes and it has been copied quite closely in several acts of special legislation for individual cities. It was embodied with few changes in the act for Boston and for Philadelphia, and for cities of the first class in Ohio, and the most important features enter into the sanitary codes of Brooklyn, Buffalo, Chicago, Paterson, and the ordinances of St. Louis. A lesser number of its items can be traced in the act for buildings in Providence, and in the sanitary regulations of Lowell.

Some minor differences may be noticed in these cities.

In Milwaukee, Paterson, and Toledo a tenement house is one occupied by two families, in Denver and San Francisco it is a tenement if occupied by two families above the first floor, in Chicago if there are more than three families or more than two on one floor, and a similar definition is found in St. Louis, Boston, Baltimore, Providence, Kansas City, and Syracuse. In Buffalo four families, or three above the second floor are necessary to constitute a tenement. In Lowell and Bridgeport, tenement house plans must be approved by the board of health, but only when the buildings are over two stories. In New Haven, a rear tenement cannot be built without the permission of the board of health.

The difficulty of fixing the responsibility for the care of tenements is overcome in Buffalo by the following:

"Every owner or lessee of a tenement or lodging-house, and every person having control of a tenement or lodging-house, shall, on or before May 15, 1893, and in the month of May in each year thereafter, file in the office of the department of health a certificate stating his name and address, and also, if he shall not be a permanent resident of the city, the name and address of his resident agent for the management of said tenement or lodging house; and also containing a description of the property by street number or otherwise, as the case may be, in such manner as will enable the department to easily find the same, and also the number of apartments in each house, the number of rooms in each apartment, the number of persons occupying each apartment and the trades and occupations carried on therein, and said facts shall be recorded in the office of the department of health. He shall also file

with the said certificate a plan or diagram of the lot, and each floor in the building, showing all dimensions, and also showing all doors, windows, closets, water-closets, privies, staircases, and means of exit, and shall file such a plan or diagram annually, unless his annual certificate shall state that no changes have been made affecting the previous plan or diagram." [1]

The form of owner's certificate used in Buffalo is shown in Appendix 127.

In Boston the cellar ceiling must be one foot above the ground, in Baltimore three feet, in Cleveland, Milwaukee, Jersey City, Toledo, and Columbus four feet, and the rooms must be eight feet high, and in Cincinnati three and one-half feet above the ground and seven and one-half feet high. A concrete floor three inches thick is allowed in Philadelphia and Pittsburgh, and two inches in the District of Columbia and Buffalo.

The Buffalo rules are very strict in regard to cellars. No one is allowed to sleep, lodge, or dwell in a cellar.

"The cellar of every tenement or lodging-house shall be protected by a two-inch bed of concrete (cement and gravel or tar and gravel) or asphalt, or hard bricks laid in cement with concrete; asphalt or brick shall be laid on four inches of broken stones, such stones not being greater than two inches in size."

In Philadelphia on corner lots ninety per cent. may be covered by the tenement and on the other lots eighty per cent., in Boston sixty-five per cent. at second story level measured to the middle line of the street on which it abuts, in Buffalo on corner lots ninety per cent., on others seventy-five per cent., in Cincinnati interior lots ninety per cent. above the first story, and for each additional story two and one-half per cent. less. In Chicago and the District of Columbia a ten-foot space must be left in the rear. In Philadelphia space between a front and rear tenement must not be less than twelve feet, in Baltimore thirty feet. In Cleveland and Columbus the length of the space must be three-fourths of the width of the buildings, and in Cleveland for two-story buildings the space must be twenty feet.

In Chicago if rooms open into a shaft the latter must have at least thirty-six square feet of area, in Denver forty square feet. In Philadelphia such air shaft must be eight feet wide and every window must be eight feet from the opposite wall or lot line. In Baltimore, Kansas City, Cleveland, Milwaukee, District of Columbia, and Providence the law permits rooms to open into a room with windows but it must also open into the hall. Air shafts in Chicago must for three-story buildings be thirty-six feet square, for four stories forty-six feet, and for five stories fifty-six feet, and so on increasing ten feet for each story. In

[1] Buffalo, Ordinances, Chapter 25, Sec. 123.

Cleveland and Columbus the areas are for three stories twelve square feet, for four stories sixteen square feet, and for five stories twenty square feet. In Denver, Toledo, and Milwaukee for three stories the area is forty square feet, and for four stories fifty square feet, increasing ten feet for each story, and the air space is not to be roofed over. In Boston two open spaces must be left on the lot, ten feet wide and of an aggregate length of one twenty-fifth of area of building, also a clear open space at rear in depth one-half the width of the street in front of the building. In Buffalo there must be a "court" ten feet wide and of 250 square feet of area. The width of shafts must not be less than two feet in Chicago and three feet in Cleveland. In Philadelphia the open space at side or rear must cover twenty per cent. of the lot and the minimum width of all spaces is eight feet, or if between tenements twelve feet.

In Buffalo every room must have a window opening into a street, yard or court, which window must equal in area one-tenth of the area of the room, and must extend seven and one-half feet above the floor and both sashes must be movable. In Lowell every room must have a window of twelve square feet area, and the sash must be hung with weights, and there must be a window in every hall except with the permission of the board of health. In Philadelphia there must be a window of twelve square feet in every room, and there must be eight feet between the window and every dead wall, and the window must extend eight feet above the floor. Rooms may be seven feet high in Columbus and Cleveland, seven and one-half in Cincinnati, and must be eight and one-half in Jersey City.

In Boston and St. Louis tenements must not be over two and one-half times the width of the street in height, in Milwaukee and Toledo the height must not be over two and two-thirds the distance from the face of the building to the middle of the street. In the District of Columbia no building is to exceed in height the width of the street and there is a maximum of ninety feet. In Buffalo on streets less than twenty feet wide no tenement may be more than thirty feet high, and in Providence not over thirty-five feet.

In New York City there must be one water-closet on each floor for every two families and none are allowed in the yard. In Chicago none are allowed in cellars. In Philadelphia there must be one for every suite of rooms and none are allowed in sleeping rooms. In Boston, Baltimore, and Denver there must be one water-closet for every twenty persons. In Buffalo there must be one for every three families or every fifteen persons, in Detroit one for every two families, in Rochester one for every ten persons. In Buffalo, Hartford, Pittsburgh, and Rochester

no water-closet may be in a cellar. In Chicago and Denver a water-closet must not be ventilated by the same shaft that ventilates a habitable room.

In Chicago tenements must have the wall and ceilings whitewashed in April and October each year, and in Boston in April or May, and in Buffalo twice a year.

In Philadelphia there must be 700 cubic feet of space in every habitable room. In Denver there must be 700 feet for each occupant, in Buffalo or Nashville 600 feet, and in the District of Columbia 400 cubic feet. In the latter city the health officer may affix a notice to any room stating the number of occupants that may be allowed and must serve a similar notice on the owner. In Rochester there must be 500 cubic feet for each occupant with a floor space one-twelfth as great.

In Philadelphia tenement houses of over four stories must be fireproof. There must be tower fire escapes, and the stairs must extend to the ground floor. Stairs must be three feet wide in a fifteen room building, three and one-half feet in a tenement house of from fifteen to twenty rooms, and four feet wide in tenements of over twenty rooms. Stairs shall have an eight inch riser and nine inch tread without the nosing. In Buffalo no winders shall be less than twelve inches wide at the middle point of the stair. There shall be a staircase leading to the roof with an opening three feet by two feet. In Buffalo:

"Every tenement or lodging-house hereafter erected more than two stories high shall have at least two independent means of egress, each accessible from each apartment, either directly or by means of common halls, and shall conform to existing building laws, ordinances, rules and regulations relating to fire escapes.

"In every tenement-house containing eight families or more, and of the height of three stories or more, and in every lodging-house at least one red light shall be kept burning at night on every flight of stairs, and one or more gongs shall be placed and be of such size and number as could give an alarm through the house in case of fire. All doors of exit or entrance shall open outward. The superintendent may make such other or further requirements for prevention or escape from fires as may be reasonably necessary under the conditions of each case."[1]

In Buffalo, as in New York, there must be water on each floor, and for each family, and in Philadelphia there is the same requirement, and there must be a sink for each tenement and there must be no hydrant in the yard.

Buffalo has the following:

"'Ashes, garbage, etc.'—All receptacles for ashes, waste, and other substances liable by spontaneous combustion or otherwise to cause fire, shall be made of incombustible material, satisfactory to the superintendent. Every building used as a tenement or lodging-house shall have outside and appurtenant to said building, on land of the owner, a suitable space, satisfactory to the health commissioner, and

[1] Buffalo, Ordinances, Chapter 25, Sec. 136-7.

approved by him in writing, for the temporary deposit of garbage and other refuse matter. The requirement that such deposit shall be made upon the land of the owner shall not apply to any building already erected where it covers the whole lot, or where there is no direct exit from the court of such building."[1]

In Illinois, in cities of over 50,000 inhabitants, the plans of all tenement houses must be approved by the board of health.

The various building and plumbing laws which are enforced in all the larger cities have done much to improve the character of tenement houses though they may have no special provisions relating to that class of buildings.

Boston, Buffalo, Chicago, New York, and St. Louis all have systematic inspection of their tenement houses, and in New York in 1896, fifty sanitary police were detailed for this service, and in Chicago, ten.

In New York City and Boston the law requires the tenement house inspection to be made twice a year. In the latter city this is perfunctorily made for the apartment houses, but in the tenements of the poor monthly, weekly, and even daily inspections are made. In New York the inspectors are simply required to look after nuisances and the violations of the law in tenements. They are not required to make a full report of the conditions of each house for filing in the office. This is required in St. Louis and Buffalo and in the latter city a form is used which is shown in Appendix 49.

In New York night inspections are made to determine over-crowding and for this work the following blank is used:

HEALTH DEPARTMENT.

SANITARY BUREAU.

Report of Night Inspection made at .....*o'clock P. M.*, ...*189*

of premises situated .....

by Sanitary Officers .....

FLOOR	NAME OF TENANT	Family		Lodgers		Size of Rooms			Total Cubic Feet	Cubic Feet for Adults	Cubic Feet for Children
		Adults	Child	Adults	Child	Length	Width	Height			

Sanitary Officers, ...

[1] Buffalo, Ordinances, Chapter 25, Sec. 139.

In New York in 1896 there were made 190,134 inspections which resulted in 38,858 complaints of nuisances. There were 40,461 front tenements and 2,448 rear tenements. These houses were occupied by 339,237 families with 1,487,392 persons, of whom 180,359 were under five years of age.

In order to enforce the law requiring lights in tenements from sunset till 10 P. M., night inspections were made. One hundred and fifty inspectors visited 40,000 houses between 26 and 30 March, 1896; 14,000 violations of the law were found and orders issued. At a subsequent inspection 5,630 violations were found and notices of suit were served. Another inspection in April showed that in all cases the law had been complied with.

Night inspections are also made in Newton, Mass., and in one instance thirteen persons were found in a room of 1,700 cubic feet.[1]

In St. Louis in 1896 there were in 1,851 tenement houses 59,621 persons. Of the occupied rooms there was an average of 1.4 persons to a room. The average cubic capacity of rooms was 1,556 feet and the amount of space per person was 1,111 cubic feet.

Lodging Houses.

The laws governing the construction of tenements are usually made applicable to lodging houses as well, but there are in some cities other regulations prescribed, either by statute or ordinance. The Boston act and the Pennsylvania law have the following requirements for the licensing of lodging houses:

"No such license shall be granted until the inspector of buildings of said city has certified that the said building is provided with sufficient means to escape in case of fire, and that suitable appliances are provided for extinguishing fires and for giving alarm to the inmates in case of fire; and said inspector may from time to time require such alterations to be made or such additional appliances to be provided as may in his judgment be necessary for the protection of life and property in case of fire.

"No such license shall be granted until the board of health has certified that the building is provided with a sufficient number of water-closets and urinals, and with good and sufficient means of ventilation; and said board may from time to time require the licensee to thoroughly cleanse and disinfect all parts of said building and the furniture therein, to the satisfaction of said board."[2]

In pursuance of the above statute, the board of health of Boston has adopted the following regulations:

"1. The means for light and ventilation must be satisfactory to the board of health and beyond the control of lodgers.

"2. All floors and stairways must be sound, smooth and either painted or shellacked.

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[1] Newton, Report of Board of Health (1897), p. 33.

[2] Massachusetts, Chapter 414 of 1894, Secs. 3–4.

[illegible]

The following is from the Sanitary Code of the City of New York:

"[illegible] The beds in all lodging-houses and in every room in which beds are let for lodgers shall be separated by a passageway of not less than two feet, horizontally, and all the beds shall be so arranged that under each of them the air shall freely circulate, and there be adequate ventilation. Four hundred cubic feet of air space shall be provided and allowed for each bed or lodger, and no more beds shall be permitted than those provided in this way, unless free and adequate means of ventilation exist, approved by the board of health, and a special permit in writing be granted therefor, specifying the number of beds or the cubic air space which shall under special circumstances be allowed."[2]

In Fitchburg 500 cubic feet of space are required for each lodger, and a similar requirement is found in the California law.[3] In Illinois[4] 400 cubic feet are required and no more than six persons may sleep in one room.

In order to secure the enforcement of these sanitary regulations, the licensing and inspection of lodging houses are necessary. Lodging houses are licensed in Boston, Jersey City, New York City, and Philadelphia. In Boston and Pennsylvania cities it is provided for by

[1] Boston, Rules of Board of Health, 22 March, 1898.

[2] New York, Sanitary Code (1899), Sec. 26.

[3] California, Act of 3 April, 1876.

[4] Illinois, Act of 21 April, 1899.

statute. In Boston[1] every building not licensed as an inn, in which ten or more persons are lodged for a single night for a price of twenty-five cents or less, is a lodging house. All such must take out an annual license from the board of police. No fee is charged for the license. In Pennsylvania[2] the law is applicable to all cities and the mayor issues the license; in other respects it is like the Boston act. In New York City licenses are required for lodging houses containing more than four beds.[3]

Both the New York and Boston acts and the Illinois law require the proprietors of lodging houses to keep a register of all lodgers which shall at all times be open to inspection. In New York[4] the register is only to be kept between the 1st of September and the 15th of November, but in Boston it is to be permanent. In New York the board of health furnishes the record book, and the proprietor every fortnight must make a sworn return of the particulars in regard to each lodger for the preceding twenty-four hours. The following is the heading of the return made in pursuance of this law:

Name.
Birthplace.
Residence.
Color.
Approximate age, height, and weight.
Peculiarities of form.
Visible marks on face.
Whether monthly, weekly or daily lodger.
Whether or not he occupies a bed.

In Illinois the keeper of the lodging house must file annually with the county clerk such statements as the state board of health may direct.

In New York nightly inspections are made of each house. This not only results in a strict enforcement of the laws against overcrowding and filthiness, but is the means of getting control of walking cases of conta-

[1] Massachusetts, Chapter 414 of 1894.

[2] Pennsylvania, Chapter 306 of 1895.

[3] New York, Sanitary Code (1899), Sec. 201:

"That for all lodging-houses in which beds are let for lodgers containing four or more beds in any apartment therein for the use of lodgers, a permit in writing from this department shall be required, and no person in the City of New York shall have, lease, let or keep any such lodging-house or the lodgings therein, or assist in the keeping, hire, or assist in hiring, or conduct the business of any such lodging-house, or the lodgings therein, except pursuant to the terms and conditions of a permit in writing previously obtained therefor from this department, an application for which shall be made in accordance with the rules and regulations of the board of health by the person or persons who propose to use the same.

[4] New York, Chapter 758 of 1895.

gious disease. Many a mild or incipient case of small-pox has thus been discovered, which probably would otherwise have become the starting point of an outbreak. The accompanying blank form of report shows the items to be noted by the night inspectors in New York.

MEMORANDA.

SANITARY BUREAU.

Report of.....Class Lodging Houses, Inspected.....189

REPORT OF THE SANITARY CONDITION.									
Number	STREET	Privies	Urinals	Chamber Utensils	Sinks	Bedding	Walls and Ceilings	Floors	Beds in Excess

Respectfully submitted,

.....

Sanitary Officer.

Of the difficulties of maintaining a high standard in lodging-houses the Boston board of health speaks as follows:[1]

"One drawback to the proper sanitation of these houses is the disinclination of the patrons to avail themselves of such ventilation as is provided, as they much prefer a heated atmosphere, however foul, to fresh air of a lower temperature.

"A proprietor of one of these lodging-houses has instituted a reform, which although very unpopular among his customers could be imitated by others in the business with beneficial results, viz.: that of requiring every lodger to take a bath or going elsewhere for accommodations."

In this connection there may be profitably read an article in the *Forum* of November, 1894, presenting the view taken of lodging house restrictions by the average lodger.

Besides the cities above mentioned, others, as Chicago and St. Louis, make more or less frequent inspections of their lodging houses. In Illinois inspection of lodging houses in cities of 100,000 inhabitants and over has by a recent act been placed in the hands of the state board of health.

In New York City in 1896 there were nine lodging houses with 300 lodgers or over, thirteen with from 200 to 300, fifty-six with from 100 to 200, twenty with from 50 to 100, and twelve with less than fifty lodgers: in all 110 lodging houses in the city.

[1] Boston, Report of Board of Health (1895), p. 95.

In Chicago in 1898 there were 128 lodging houses which provided on the average for 6,737 lodgers per night. Thirty-nine of these houses were provided only with bunks, 2,703 bunks in all, while in the other houses there were 6,350 rooms with partitions running part way up and 533 entirely separate rooms.

In Philadelphia in 1896 the number of lodging houses was eighty-three, and of beds 3,037, and in 1899 there were 119 houses, but the number of beds was not given.

Sweat Shops.

The sweating system is associated with, if it be not, the direct cause of the most terrible phase of human life that is found in the United States. A sweat shop is a manufactory in the dwellings of the very poor. Very excellent accounts of the sweating system may be found in a report on that subject by the House Committee on Manufactures, 52 Congress, Report No. 2309, and also in Bulletin No. 4 of the department of labor for May, 1896. The writer of the latter article, Henry White, general secretary of the United Garment Workers of America, sums up the conditions that produce the sweating system; first, crowded population; second, high rent; third, contract work. Home labor if the home be healthful, the labor reasonable, and the wages fair, is by no means to be discouraged; but the gradations are gradual from this ideal condition of labor to the destruction of home by the overcrowding and intense application and competition, and starvation wages of the sweat shop. As it is a product of high rent and competition, it becomes a crying evil in great cities.

The efforts that have been made to secure remedies by legislation have been both by the wage earners themselves and by others interested in promoting the welfare of the poor. In this movement the danger to the public from the transmission in the goods made, of contagious diseases from the makers to the buyers has figured largely. Health inspectors and visitors of the poor have too often seen the infection of garments in process of making, to doubt that this danger is a real one; but it has doubtless been much exaggerated. The duty of the state to help the helpless, and make life more bearable for the most wretched of mankind, is reason enough for any action which will abolish or mitigate the sweat shop, without conjuring up an exaggerated danger of sickness to the well-to-do.

The following states have legislation concerning sweat shops: Illinois, Indiana, Maryland, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Wisconsin. The first law was passed by New

gious disease. Many a mild
been discovered, which prol
starting point of an outbrea
shows the items to be note

Report of.....

Number	STREET	Privi

O
the

[illegible] of [illegible] goods use [illegible] health, and such [illegible] such board may [illegible] manufactured or in the [illegible]

[illegible] amended as follows:

[illegible] dwelling house shall be used for the [illegible] knitting therein any coats, vests, trousers [illegible] whatsoever, except by the members of the [illegible] family desiring to do the work of making, altering, [illegible] vests, trousers or wearing apparel of any descrip- [illegible] apartment in any tenement or dwelling house shall [illegible] approved by the chief of the district police, to do such work [illegible] may be applied for by and issued to any one member of [illegible] desiring to do such work. No person, partnership or corporation [illegible] employ or contract with any member of a family not holding a license [illegible] to make, alter, repair or finish any garments or articles of wearing apparel [illegible] in any room or apartment in any tenement or dwelling house as [illegible] Every room or apartment in which any garments or articles of wear-

[illegible] New York, Chapter [illegible]
[illegible] New York, Chapter [illegible]

In (de, altered, repaired or finished, shall be kept in a cleanly condi-
on the subject to the inspection and examination of the inspectors of the
wer r the purpose of ascertaining whether said garments or articles of
ho or any part or parts thereof are clean and free from vermin and
an infectious or contagious nature. A room or apartment in any
elling house which is not used for living or sleeping purposes, and
onnected with any room or apartment used for living or sleeping pur-
ich has a separate and distinct entrance from the outside, shall not be
e provisions of this act. Nor shall anything in this act be so construed
t the employment of a tailor or seamstress by any person or family for
of wearing apparel for such person's or family's use."[1]

Pennsylvania law has an additional provision:

less than two hundred and fifty cubic feet of air space shall be allowed for
l every person in any workroom where persons are employed at such labor
reinbefore described. There shall be sufficient means of ventilation pro-
n each workroom of every such establishment, and said workroom or rooms
l establishment shall be kept thoroughly clean, sanitary and fit for occupancy
uch work or business. The factory inspector and deputy factory inspector,
er the direction of the factory inspector, shall notify the owner, agent or lessee
vriting to provide, or cause to be provided, ample and proper means for ventilat-
g such workroom or rooms, and to put said workroom or rooms in a thoroughly
ean, sanitary and fit condition for occupancy for such work or business, and shall
rosecute such owner, agent or lessee if such notification be not complied with
within ten days of the service of such notice; and any factory or shop under this
act requiring exits or other safeguards provided for in the fire escape law, the same
shall be erected and located by order of the factory inspector regardless of the
exemption granted by any board or [of] county commissioners, fire marshals or
other authorities, and if such alterations and additions are not made within sixty
days from the date of such notice, or within such time as said alterations can be
made with proper diligence upon the part of such proprietors, said proprietors or
agents shall be deemed guilty of violating the provisions of this act."[2]

The Ohio law forbids cooking in a sweat shop and also provides that there shall be no bed in it. There must be a stairway leading to the outside of the house. There must be separate water-closets for the two sexes and the number of closets is prescribed. There must be 250 cubic feet of air space for each person by day and 400 feet at night. In Maryland there must be 400 cubic feet of air space per person if the temperature rises above eighty degrees between October first and May first or if artificial light is required between 8 A. M. and 4 P. M. In Indiana 400 cubic feet of space are required unless the room is to be lighted by electricity and a permit must be obtained from the factory inspector.

As will be seen from the above, the part played by the board of health in these reforms, is not usually very great. The work naturally comes within the jurisdiction of the factory inspector and the results of the efforts made may be studied in their reports. A review of this work may be found in the article by Mr. White above referred to.

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[1] Massachusetts, Chapter 150 of 1898.

[2] Pennsylvania, Chapter 37 of 1897, Sec. 2.

APPENDICES.

APPENDICES.

NO. 1.

ANNUAL REPORT

OF THE

HEALTH OFFICER OR SECRETARY OF THE BOARD OR BUREAU OF HEALTH

Of the ..... *of* ....., ... *County, made to the State Board of Health of Pennsylvania, for the year, beginning January 1, 189 , and ending December 31, 189 .*

☞(Include nothing outside of these dates.)

☞ The annual report of the local board of health should be made as early in January as possible.—Write in the blank space after each question, or, if more room is needed, write on the accompanying blank sheet placing the appropriate figure before each answer.

1. Give the name and address of each member of your board.

Name.	Post Office Address.
....., President.	.....
....., Member.	.....
....., "	.....
....., "	.....
....., "	.....
....., Secretary.	.....
....., Health Officer.	.....

2. How many meetings have been held by the board during the year?
3. Have any improvements or changes been made as regards water supply, drainage and sewerage, or in the methods employed in disposing of excreta?
4. Nuisances. How many have been reported to your board?
   How many have been removed?
   Please report the facts in regard to any nuisances of unusual character, or which have given unusual trouble in respect to decisions regarding them, or in which there has been unusual difficulty in securing abatement.
5. Mortality. What is your population?
   Total number of births?
   Total number of deaths?
   Death rate per thousand of persons living?
6. Communicable diseases. Please give the facts called for in the following table:

Name of Disease.	No of Cases.	No. of Deaths.	No. of Outbreaks.	No. of Houses Inspected.	No. of Outbreaks Confined to First House.
Smallpox.					
Diphtheria (including Croup).					
Measles.					
Scarlet Fever.					
Consumption.					
Typhoid Fever.					

7. Are these diseases reported to your board by the physicians in attendance in accordance with the law, ordinance or regulation requiring such reports?

8. What action has been taken by your board when cases of the communicable diseases have been reported to it?

9. Were houses in which cases of smallpox, diphtheria or scarlet fever occurred placarded?

10. What other epidemic diseases were more than usually prevalent during the year? (Influenza, whooping cough, German measles, pneumonia, cerebro-spinal meningitis, dysentery, diarrhœal diseases of children, etc.)

11. Please communicate the facts regarding any cases of disease which were interesting from a sanitary point of view. (Unusual course of epidemic prevalence, unusual symptoms or want of certain symptoms, observations as regards period of incubation, communication of diseases by contagion, spread of contagious diseases by public funerals, long periods of vitality of infection, concurrent or consecutive prevalence of diseases, etc.)

12. Schools. Have any special cases come under your observation in which unhealthy conditions existed? Have contagious diseases entered any of the schools? If so, what action was taken?

13. Have you any particularly unhealthy localities? If so, what appears to be the cause of such unhealthfulness?

14. What methods can you suggest for improving your sanitary conditions?

15. Accidents. Has sickness or death resulted from accidental causes; drowning, fires, and kerosene accidents? If accidents have occurred from the last cause, please report in full to this Board.

16. Please communicate the facts regarding any cases of disease which appeared to have been caused by polluted water, cess-pool or sewer gas, defective ventilation, lead, arsenical, or other forms of poisoning.

17. Have any instances of food adulteration, or injurious effects from it, come to your knowledge?

18. Diseases of animals. Please report any cases of diseases of animals which have occurred, and any cases of relation or apparent relation between such diseases and human diseases.

19. Were any by-laws adopted by your board during the year? If so, please forward copies of all such to the office of the State Board.

20. Please give an account of any other work of interest which has been done by your board during the year.

21. Has the experience of your board suggested any changes which ought to be made in the health laws of the State? If so, please report them.

22. Registration. Do you enforce registration of births?
Do you enforce registration of still-births?
Do you enforce registration of marriages?
Do you enforce registration of plumbers?
Do you enforce registration of undertakers?
Do you enforce registration of nurses and midwives?
Do you enforce registration of vaccination of school children?

23. What compensation has been received by the secretary and health officer of your board? If payment has not been received, for what reason?

Signed .....

Date ....., *189* .

NO. 2.

SANITARY REGULATIONS.

RECOMMENDED BY THE STATE BOARD OF HEALTH OF NEW YORK FOR ADOPTION BY LOCAL BOARDS OF HEALTH.

Nuisances defined. SECTION 1. Whatever is dangerous to human life or health; whatever building, or part or cellar thereof, is overcrowded or not provided with adequate means of ingress and egress, or is not sufficiently supported, ventilated, sewered, drained, lighted or cleaned; and whatever renders soil, air, water or food impure or unwholesome, are declared to be nuisances and to be illegal; and every person having aided in creating or contributing to the same, or who may support, continue or retain any of them, shall be deemed guilty of a violation of this ordinance, and shall also be liable for the expense of the abatement or remedy required.

Privies, cess-pools, etc. § 2. No privy-pit, cess-pool or reservoir into which any privy, water-closet, stable, sink or other receptacle of refuse or sewage is drained, shall be constructed or maintained in any situation or in any manner whereby, through leakage or overflow of its contents, it may cause pollution of the soil near or about habitations, or of any well, spring or other source of water used for drinking or culinary purposes; nor shall the overflow from any such reservoir or receptacle be permitted to discharge into any public place or in anywise whereby danger to health may be caused. And every such pit, reservoir or receptacle shall be cleaned and the contents thereof removed at such times and under such precautions as the Board of Health may prescribe. Violation of any of the provisions of this ordinance shall subject the offending party to a penalty of ..... for each day's continuance of the nuisance after due notice to abate it from an authorized officer.

Sewers, drains, etc. § 3. All house-sewers or drains for the conveyance of deleterious or offensive matters shall be water-tight, and the plans and methods of their construction shall be subject to the approval of the Board of Health. In streets or avenues where public sewers are or shall be constructed, the Board of Health may order house-connections to be made therewith.

House refuse, garbage, etc. § 4. No house-refuse, offal, garbage, dead animals, decaying vegetable matter, or organic waste substance of any kind, shall be thrown upon any street, road or public place, and no putrid or decaying animal or vegetable matter shall be kept in any house, cellar or adjoining outbuilding for more than twenty-four hours. Violation of any of the provisions of this ordinance shall subject the offending party to a penalty of.....
.....

Filled-in or made land. § 5. No sunken places shall be filled, nor made land constructed, with any materials containing an admixture of putrescible animal or vegetable matter, under penalty of.....for each cartload, or part thereof, of such materials deposited.

Noxious trades. § 6. No person or company shall erect or maintain any manufactory or place of business dangerous to life or detrimental to health, or where unwholesome, offensive or deleterious odors, gas, smoke, deposit or exhalations are generated, without the permit of the Board of Health, and all such establishments shall be kept clean and wholesome so as not to be offensive or prejudicial to public health; nor shall any offensive or deleterious waste-substance, gas-tar, sludge, refuse or injurious matter be allowed to accumulate upon the premises or be thrown or allowed to run into any public waters, stream, water-course, street or public place. And every person or company conducting such manufacture or business shall use the best approved and all reasonable means to prevent the escape of smoke, gases and odors, and to protect the health and safety of all operatives employed therein. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....nor more than.....for each offense.

Unwholesome food.

§ 7. No meat, fish, bird, fruit, or vegetables, milk, or anything for human food or drink, not being then fresh or properly preserved, sound, wholesome and safe for such use; nor any flesh of any animal which died by disease, or which was at the time of its death in a sickly or unwholesome condition; nor the carcass or meat of any calf which was at the date of its death less than four weeks old, or of any lamb which was at the date of its death less than eight weeks old, or of any pig which was at the date of its death less than five weeks old shall be brought within the limits of this municipality, nor offered or held for sale as food therein. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....and by the seizure and destruction of such unsound, unwholesome, immature food substances.

Slaughter-houses, markets, etc.

§ 8. No person or persons, without the consent of the Board of Health, shall build or use any slaughter-house within the limits of this municipality and the keeping and slaughtering of all cattle, sheep and swine, and the preparation and keeping of all meat, fish, birds, or other animal food, shall be in the manner best adapted to secure and continue their wholesomeness as food; and every butcher or other person owning, leasing or occupying any place, room or building wherein any cattle, sheep or swine have been or are killed or dressed, and every person being the owner, lessee or occupant of any room or stable wherein any animals are kept, or of any market, public or private, shall cause such place, room, building, stable or market, and their yards and appurtenances, to be thoroughly cleansed and purified, and all offal, blood, fat, garbage, refuse and unwholesome and offensive matter to be removed therefrom at least once in every twenty-four hours after the use thereof for any of the purposes herein referred to, and shall also at all times keep all woodwork, save floors and counters, in any building, place or premises aforesaid thoroughly painted or whitewashed; and the floors of such building, place or premises shall be so constructed as to prevent blood or foul liquids or washings from settling in the earth beneath. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of.....for each day's continuance or repetition of the offense.

Notification of infectious disease.

§ 9. Every householder or head of family in a house wherein any case of infectious disease may occur shall report the same to the Board of Health or to the Health Officer within twelve hours from the time of his or her first knowledge of the nature of such disease; and, until instructions are received from the said board or the Health Officer, shall not permit any clothing or other article which may have been exposed to infection to be removed from the house; nor shall any occupant change his residence elsewhere without the consent of the said Board or Health Officer.

Every physician who may be called to attend a case of infectious disease shall, as soon as he discovers the nature thereof, make a written report specifying the name and residence of the patient, the nature of the disease, and any other facts relating thereto which he may deem important to the public health, and affix the date and sign his name thereto, and he shall transmit the same to the Board of Health within twelve hours as above provided. The diseases to be thus promptly reported are: Asiatic cholera, yellow fever, typhus and typhoid fevers, small-pox, scarlet fever, measles, diphtheria and membranous croup. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of.....

I[illegible]

§ 10. No person or article liable to propagate a dangerous disease shall be brought within the limits of this municipality unless by the special permit and direction of the Board of Health; and any one having knowledge that such person or article has been brought within such limits shall immediately notify the said board thereof. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than..... nor more than.....

E[illegible]

§ 11. No person shall, within the limits of this municipality, unless by permit of the Board of Health, carry or remove from one building to another any patient affected with any contagious or infectious disease. Nor shall any person by any exposure of any individual so affected, or of the body of such individual, or of any article capable of conveying contagion or infection, or by any negligence connected with the care or custody thereof, or by a needless exposure of

himself or herself, cause or contribute to the spread of disease from any such individual or dead body. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....

Funerals after infectious diseases.

§ 12. There shall not be a public or church funeral of any person who has died of Asiatic cholera, small pox, typhus fever, diphtheria, membranous croup, scarlet fever or measles, without the permit of the Board of Health therefor; and the family of the deceased shall in all such cases limit the attendance to as few as possible, and take all precautions possible to prevent the exposure of other persons to contagion or infection. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....

Infectious diseases of animals.

§ 13. No animal affected with an infectious or contagious disease shall be brought or kept within the limits of this municipality, except by the permission of the Board of Health; and the bodies of animals dead of such disease or killed on account thereof, shall not be buried within five hundred feet of any residence, nor disposed of otherwise than as the said board or its Health Officer shall direct. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....

Reports of marriages and births.

§ 14. It shall be the duty of the groom in every marriage, or the clergyman or magistrate performing the ceremony, and of the parents or custodian of every child born, and the physician or midwife who attended at the birth of such child to make sure that the prescribed report of such marriage or birth is presented to the Board of Health or its registering officer within thirty days, under a penalty of.....for failure to do so; and for each ten days of continued neglect to present such report, after the expiration of the first thirty days, an additional penalty of.....shall be incurred.

§ 15. It shall be the duty of the physician or midwife in attendance at every birth to write out and sign, upon the form prescribed by the State Board of Health, the certificate of such birth, and make sure that said certificate is returned to the local board of health, or person designated by it to receive it, within thirty days of such birth. Any violation of the provisions of this ordinance shall subject the offending party to a penalty of.....

Certificates of death and burial permits.

§ 16. Every undertaker or other person who may have charge of the funeral of any dead person, shall procure a properly filled-out certificate of the death and its probable cause, in accordance with the form prescribed by the State Board of Health, and shall present the same to the designated officer or member of the Board of Health, and obtain a burial or transit permit thereupon, at least twenty-four hours before the time appointed for such funeral; and he shall not remove any dead body until such burial or transit permit shall have been procured. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....

§ 17. It shall be the duty of the physician last in attendance upon any person who may die within the limits of the jurisdiction of this Board of Health, to write out and sign without delay, upon the form prescribed by the State Board of Health the professional certificate of the death and send it to or leave it with the family of the deceased, or hand or send it to the undertaker in charge of the remains. In case an inquest has been required by law, the coroner shall fill out the said certificate, and if no inquest has been required by law and no physician has been in attendance, the certificate shall be filled out, setting forth the probable or believed cause of death, by some reputable person known to the officer issuing the burial or transit burial permit, and the said person shall also make affidavit to the facts set forth in the certificate, which affidavit must be attached to said certificate. Any violation of the provisions of this ordinance shall subject the offending party to a penalty of.....

Sextons, cemetery keepers, etc.

§ 18. Every person who acts as a sexton, or undertaker, or cemetery keeper, within the limits of this municipality, or has the charge or care of any tomb, vault, burying ground or other place for the reception of the dead, or where the bodies of any human beings are deposited, shall so conduct his business and so care for any such place above named, as to avoid detriment or danger to public health; and every person undertaking preparations for the burial of a body dead from contagious or infectious disease as hereinbefore enumerated shall adopt such precautions as the Board of Health

may prescribe to prevent the spread of such disease. Any violation of any of the provisions of this ordinance shall subject the offending party to a penalty of not less than.....

Duties and powers of health officer.

§ 19. The Health Officer is directed and empowered to execute and enforce all sanitary regulations of general obligation now or hereafter to be published by this board; also to enter upon or within any premises where conditions dangerous to the public health are known or believed to exist, and to examine into the nature of complaints made by any of the inhabitants concerning sources of danger or injury to health; and he shall preserve accurate records of his official actions and report the same to the Board of Health at its next meeting. And whenever in his judgment danger to public health shall arise requiring special regulation not of general application, he shall forthwith notify the president of the Board of Health, who shall thereupon convene the board to take such action as may be necessary and proper.

Penalties.

§ 20. Every person who willfully violates or refuses to comply with, or who resists any ordinance, order, regulation or resolution of the Board of Health of this municipality will be liable to the arrest, action, penalty, fine and punishment provided and declared in the Public Health Law, chapter 25 of the General Laws, 1893, of which notice must be taken.

NO. 3.

SIZE 8½ IN. X 11 IN.

REPORT

Of .....Undertaker in the City of Milwaukee, for the month of.....189 to the Commissioner of Health, in pursuance of Chapter 4, of City Ordinances. Reports are to be made on the first of every month.

Section 80 of Chapter IV, of General Ordinances of the City of Milwaukee, relating to Burials, reads as follows: Upon the death of any person within the corporate limits of the City of Milwaukee, it shall be the duty of every undertaker or other person, who inters such deceased person, and before the removal of such deceased person for interment, and within thirty-six hours after the death of such person, to apply to the Health Office for a permit for interment from said Commissioner of Health or Secretary. (Permits will only be issued upon Certificates of Physician, of Commissioner of Health or one of his Medical Assistants.)

When Interred	NAME OF DECEASED.	WHERE INTERRED	Date of Burial Permit.	No.	Name of Person who signed Certificate.	Date of Death on Certificate.	

STATE OF WISCONSIN, }
COUNTY OF MILWAUKEE, } ss. I, ... Undertaker, residing at ..... Street ..... Ward, City of Milwaukee, do solemnly swear that the above report is true and correct in all respects.—So Help Me God.

Subscribed and sworn before me, this ..... day of 189

.....

NO. 4.

SIZE 3½ IN. x 10½ IN.

TOWN CLERK'S MEMORANDA.
[*This stub is not to be detached from book.*]

Deceased named in Permit.

.....

Date of Death .....18 .

Age,...*years*,..*months*,...*days.*

Buried at.....

in.....

on.....18 .

Issued to.....

Date,.....18 .

No.....

DETACH AT PERFORATED LINE.

UNDERTAKER'S VOUCHER.

Deceased named in Permit.

.....

.....

Buried at.....

in.....

on.....18 .

.....*Town Clerk.*

.....*Me.*, ...*18* .

No.....

(REVERSE.)

This coupon is to be cut off at the dotted lines, and kept by the person acting as sexton or undertaker, as a voucher that he has complied with the provisions of the law.

STATE OF MAINE. BURIAL PERMIT.

....*Me.*,.....*18* .

Permission is hereby given.....

to remove the remains of.....

Date of Death,.....*18* . *Age*,...*years*,...*months*,...*days.*

Place of Death,.....*Ward*.....

Street,.....*No*.....

Cause of Death,.....

Medical Attendant,.....

To.....*for interment*,.....*18* .

No..... .....*Town Clerk.*

(REVERSE.)

This Permit must be returned to the Clerk of the town or city *in which the death occurred*, within SIX DAYS after burial.

Any person acting as Undertaker or Sexton without a Burial Permit will be subject to a fine not exceeding one hundred dollars.— *Chap. 118, Laws of 1891.*

SIZE 4½ IN. X 11 IN.

REGISTER OF DEATH.

No.....

Date of Death.....*189*....

Full name.....

Sex.....*Color*.....*Age*.....*yrs*....*mos*.....*days*

Single, married, widowed, divorced, }.....*Birthplace*.....

Occupation.....

Father's name.....*Birthplace*.....

Mother's name.....*Birthplace*.....

Disease causing death.....

Medical attendant.....

Place of burial or removal.....

Undertaker.....

Permit granted.....*189*....

County.....

Township.....

Village.....

STATE OF MICHIGAN.

Permit for Burial or Removal.

No. ...

Date of Death.....*189*....

Full name.....*Age*.....

Disease causing death.....

Proposed date of burial or removal }.....*189*.... *Medical attendant* }.....

Proposed place of burial.....

Proposed place of removal.....*via*.....

Undertaker.....*Address*.....

A CERTIFICATE OF DEATH having been filed in my office in accordance with Public Act No. 217 of 1897, I hereby authorize the.....
(Burial or removal.)
of the body of said deceased person as stated above. In the case of death from a dangerous communicable disease, the burial or removal must be conducted according to the rules of the local and State Boards of Health.

.....*Registrar of Deaths.*

Dated.....*189*.. *Clerk of*.....

SIZE 3¾ IN. x 8 IN.

CITY REGISTRAR'S OFFICE.

Providence, R. I., 19

PERMISSION *is hereby given to remove the body of*

for Burial,

DATE OF DEATH, 19 AGE *years* *months* *days.*

PLACE OF DEATH,

CAUSE OF DEATH,

UNDERTAKER,

City Registrar.

NO. 7.

SIZE 4¼ IN. x 13 IN.

These permits are bound in books with stubs for record.

When a body from another State or city is in transit for burial, *beside the transport coupon* some cities, like New York, require that the ferry or transport agent should tear off and return a coupon to their health department, in order that it may have record. This special coupon is in such cases to be given to the ferry or bridge master or transport agent. We therefore add to the usual coupons 1 and 2, this special No. 3, for such use when required. When not needed, this coupon should not be given out or should not be signed by the officer issuing the permit.

(See back of this Coupon.)

SPECIAL COUPON FOR CITY TRANSIT WHEN REQUIRED.

Special Coupon No. Three to Transit Permit No.... of the body of.....
who died at.....N. J., and is to be buried at.....
Permit issued.....189
(Date.)
at.....
for transit through the city of.....
Signed.....
.....
(Official Title.)

Before this body leaves the city of.....through which it is in transit, the ferry or bridge master or transport agent will tear off this coupon and send it to the Heatlh Department of the city, as its regulations may require.

.....

TRANSIT PERMIT.

BACK.

State of..... Date..... 189

I HEREBY CERTIFY, That the body of.....named in this Transit Permit, has been prepared by me for transportation by being.....

(Signed).....Undertaker.

State of.....}
County of.....} On this.....day of.....A. D. 189

.....(Notary Public, Justice of the Peace), in and for the County and State aforesaid, personally appeared.....to me known, and made oath and says that all of the statements contained in the foregoing are true.

Sworn and subscribed to before me, this.....day of.....A. D. 189

[SEAL.]

Undertaker's Affidavit In case of Infectious or Contagious Diseases when required by Companies.

FRONT.

STATE OF NEW JERSEY.

TRANSIT PERMIT.

Ferry Masters, etc., See Back of Permit.

County of.....189
(City or Township.)

Permission is hereby given to remove the remains of.....aged....., who died at.....
(City or County and Township.)
on.....189 ; the cause of Death being.....
.....which is a.....
Transit Permit being asked for Burial, at.....in the State of.....

(Signed by).....
Name of Undertaker or person in charge of the Transit,
.....(Official Title.)
.....(P. O. Address.)

This Permit must in all cases accompany the body to its destination and be retained by the Superintendent of the Cemetery.

Coupon No. Two to Transit Permit No. ..... of ..... who died at .....

This coupon will be detached by Train Baggage-[illegible] and sent to General Baggage Agent. SEE BACK.

Coupon No. [illegible] Transit Permit No. ..... of ..... who died at .....

This coupon will be detached by Train Baggage-[illegible] and sent to General Agent. SEE BACK.

NO. 8.

SIZE 3¼ IN. x 5¼ IN.

STATE OF NEW HAMPSHIRE. CERTIFICATE OF DEATH.

Name.....

Place and date of Death,.....

Sex,.....Color,..... Single, Married, Divorced, or Widowed, Age, Years,..... Months,..... Days,.....

Occupation,.....Place of Birth,.....

Disease or Cause of Death,.....

Name of Father,.....

Maiden Name of Mother,.....

Birthplace of Father,.....Mother,.....

Occupation of Father,.....

.....M. D.

Date of Burial,.....189 .

Place of Burial,.....Cemetery,.....Undertaker.

NO. 9.

SIZE 8 IN. x 10 IN.

The following form of return is suggested for general adoption by the Director of the 12th Census.

RETURN OF A DEATH.

County,.....
Town,.....
Village,.....
City,.....

STATE OF

NO. OF RECORD.

NO. OF BURIAL PERMIT.

NO INCOMPLETE RETURN WILL BE ACCEPTED.

1. Name, in full,.....

2. Color:
White.
Black (Negro or mixed).
Indian.
Chinese.
Japanese.

3. Sex:
Male.
Female.

4. Conjugal Condition:
Single.
Married.
Widowed.
Divorced.

NOTE.— For questions 2, 3, and 4, strike out words not applicable.

5. Date of Death. { Year,..... Month,..... Day,..... 6. Of Birth. { Year..... Month..... Day,..... 7. Age. { Years,..... Months,..... Days.....

8. Occupation,.....
(Return occupation for all persons 10 years of age and over.)

9. Place of Birth,.....
10. Birthplace of Father,..... } State or Country.
11. Birthplace of Mother,.....

DURATION.

12. Disease or Cause of Death:

Chief Cause.....

Contributing Cause.....

Place where Disease was Contracted, if other than place of death.

.....

13. Place of Death, No.....Street,.....Ward.
If death occurred in an institution, give the name of same.....
Length of time deceased was an inmate.....and previous residence.....

.....

14. Late residence,.....
Length of residence (in city or town).....
Undertaker,.....
Place of Interment,.....
Signature,.....
of physician or informant.
Date of Certificate,.....19

NO. 10.

SIZE 7½ IN. X 12 IN.

County of .....STATE OF NEW YORK—
BUREAU OF VITAL STATISTICS.
Town of .....
Village of .....
City of ..... OF .....

Certificate and Record of Death.

Registered No.

.....

I hereby certify that I attended deceased from.....189..
to.....189..that I last saw.....alive on the.....day
day of.....189..,that.....died on the.....day
of.....189..,about.....o'clock A. M. or P. M., and that
to best of my knowledge and belief, the cause of.....death
was as hereunder written.

Duration of Disease.

Chief Cause,
.....
Contributing Cause,

Sanitary Observation,.....
Witness my hand this.....day of.....189
(SIGNATURE),
Place of Burial,.....
Date of Burial,.....M. D.
Undertaker,..... RESIDENCE,
Residence,.....

Date of Death.	Full Name.	Age, in years, mos. and days.	Color.	Single, Married or Widowed.	Occupation.	Birthplace.	How long in U. S., if foreign born.	How long resident here.	Father's Name.	Father's Birthplace.	Mother's Name.	Mother's Birthplace.	Place of Death.	Last Place of Residence.	Direct cause of Death.	Indirect cause of Death.	Date of Record.

MARGIN RESERVED FOR BINDING.

NO MUTILATED CERTIFICATE WILL BE RECEIVED.

STATE OF NEW YORK — BUREAU OF VITAL STATISTICS.

REPORT OF DEATH.

Full Name of Deceased.....

Years.	Months.	Days.

Age,.....
Single, Married or Widowed,.....
Occupation,.....
Birthplace,.....(State or Country.).....
Color and Race,.....
Father's Birthplace,.....
Father's Name,.....
Mother's Birthplace,.....
Mother's Name,.....
Place of Death,.....

Years Months Days (How long in the United States, if foreign born.) Years Months Days

How Long a Resident here,.....
Date of Death,.....
Reported by.....
Date,.....
Chief Cause of Death,.....
.....
Certified by.....M. D.
Medical Attendant.
Buried at.....
By.....Undertaker.
Residence,.....

☞ This stub will not be received as a certificate of death, as it is intended to aid the physician in keeping a registry of the deaths occurring in his practice.

NO. 11.

SIZE 5 IN. X 8 IN.

RETURN OF A DEATH.

CITY OF PROVIDENCE.

1. Date of Death.....
2. Name in Full.....
3. Date of Birth.....Age?.....yrs.....mos.....dys.
4. Place of Death, Street and Number.....
5. Usual Residence.....
6. Sex.....7. Color.....
8. Single, Married, Widowed, or Divorced.....
9. Name of Husband or Wife.....
10. Occupation of Decedent.....
11. Birthplace, State or Country.....City.....
12. Father's Name.....
13. Mother's Name.....
14. Parents' Birthplaces Fa.....Mo.....
15. Where to be Buried.....

.....

Name of Informant and Relationship to Deceased.

PHYSICIAN'S CERTIFICATE.

Please state different causes of death in order of occurrence as **FULLY** as possible, particularly in **DOUBTFUL** cases.

Date of Death..... Hour..... M.

Name.....

Causes of Death.....

.....

.....

.....

Duration of Diseases.....

.....PHYSICIAN

.....

.....

PHYSICIAN. [illegible] cause of death is given please under-

NO. 12.

SIZE 7½ IN X 8 IN.

MARGIN RESERVED FOR BINDING.

Write Plainly with Unfading Ink—This is a Permanent Record.

Place of Death. { *County*..... *Township*..... *Village*..... *City*..... }

MICHIGAN
DEPARTMENT OF STATE
LANSING
VITAL STATISTICS DIVISION
Certificate and Record of Death

[The Registrar should number each certificate received *at once*, in space below, beginning with "No. 1" for each year.]

REGISTERED NO. .....

{ Location in City } .....Ward; No.....,.....St.

Full Name.....

Date of Death

Month.	Day.	Year.
		190.....

{ Late or home residence } .....

Single, married, widowed or divorced.....Sex.....Color.....

{ If married, age at (first) marriage.....years. Parent of.....children, of whom.....are living. }

Age

Years.	Months.	Days.

Occupation.....

NOTE—The occupation should be stated for all persons aged 10 years and over. Be precise and definite, and whenever necessary give the kind of industry, trade or employment, as well as the special occupation.

Date of birth

Year of Birth	Month.	Day.
1.....		

{ Name of Father } ..... { Birthplace of Father (State or country) } .....

{ Birthplace (State or country) } .....

{ Maiden name of mother } ..... { Birthplace of mother (State or country) } .....

CERTIFICATE OF REPORTER.

The personal and family particulars herein given relative to deceased are true to the best of my knowledge and belief.

{ Date of burial or removal } ..190.. { Place of burial or removal } .....

(Signed).....

{ Signature of undertaker } ..... { Address of undertaker } .....

(Address).....

{ How long an inmate or resident } .....

{ Hospital, institution or transient } .....

For deaths in hospitals, transients, etc., only:

MEDICAL CERTIFICATE OF CAUSE OF DEATH.

I hereby certify that I attended deceased from.....190....to.....190....,

that I last saw h.....alive on.....190...., that.....died on.....190....,

about.....o'clock.....M., and that to the best of my knowledge and belief the CAUSE OF DEATH was as hereunder written:

	Duration of each cause.
Disease causing death*.....	.....
Immediate cause of death*.....	.....
Contributory causes or complications, if any*.....	.....

Post-mortem ..... { Place where Disease Causing Death was contracted, if other than place of death } .....

* *Physicians* are requested to note the "Suggestions to Physicians Relative to Statement of Causes of Death" on the back of this certificate.

In Violent Deaths, a different form of statement is necessary, as follows:

(1) *Mode of injury* and whether *accidental*, *suicidal* or *homicidal*;

(2) *Nature of injury* (immediate cause of death);

(3) Contributory causes.

Witness my hand this.....day of.....190..

{ Signature of physician health officer or coroner } .....M. D.

(Address).....

NO. 13.

SIZE 4¾ IN. X 7¾ IN.

RETURN OF A BIRTH.

CITY OF PROVIDENCE.

1. Date of Birth?.....18
2. Full name of Child?
3. Sex?..... 4. Color?.....
5. No. of Child of Mother?.....
6. Place of Birth?.....
7. Present Residence?.....
8. Father's Name?.....
9. Father's Age?.....
10. Father's Occupation?.....
11. Father's Birthplace?.....
12. Mother's Name?.....
13. Mother's Maiden Name?.....
14. Mother's Age?.....
15. Mother's Birthplace?.....
16. Color of Parents? Fa.....Mo.....
17. *Remarks?.....

.....PHYSICIAN.

N. B.—At No. 2, give the full name of the child, and be *particular to get the middle name in full.* At No. 4, state whether the child is white, black or mulatto. At No. 5, state whether it is the 1st, 2d, 3d, etc., *child of the mother.* At No. 6, give the street and number if in a city, the name of the town and village if in a village, and State if elsewhere in this country. At No. 7, give the present home of Mother. Street and No. At Nos. 9 and 14, give the age at last birthday. At Nos. 11 and 15, give the town and State, if in this country, if not, then the name of the foreign country.

*If the child was still-born, or has died since its birth, *or was illegitimate*, state the facts at No. 17, *with any other facts of interest.*

In case of twins or triplets, a *separate* blank is to be filled for *each* child.

The above blanks bound in book form with stubs are furnished to the physicians and midwives. In Massachusetts the physicians report all their births monthly on one sheet.

NO. 14.

SIZE 4 IN. X 14 IN.

COMMONWEALTH OF MASSACHUSETTS.

List of Births occurring in the practice of the undersigned during the month of.....189 .

Date of Birth.	Sex.	Color, if other than white.	Name if named.	Place of Birth.	Names of Parents. (Maiden name of mother.)	Residence of Parents.	Occupation of Father.	Birthplace of Father.	Birthplace of Mother.

Signed.....

Postals are used for reports in Florida and in Denver, Omaha, Chicago and other cities.

NO. 15.

SIZE 3¼ IN. x 7¼ IN.

.....189

To Mr.....

P. O. Address,.....

To enable me to complete the record of the birth of your child which occurred ....., 189 , please enter its name in the first line in the blank on the other side of this slip, together with the facts called for in any other lines indicated by a cross (X) made with pen or pencil.

The law requires, under penalty for neglect, parents to report the births of their children; but, irrespective of this, a permanent and accurate record of all births is a matter of great importance to parents, to children, and to society.

Respectfully,

.....

Clerk of.....

(REVERSE.)

RECORD OF A BIRTH.

Child's Name.....
Date of Birth.....
Place of Birth.....
Sex..... Color.....
Living or Stillborn.....
No. of Child, 1st, 2nd, etc.....
Father's Name.....
" Birthplace.....
" Color.....
" Residence.....
" Occupation.....
Mother's Maiden Name.....
" Birthplace.....
" Color.....
" Occupation.....
Name and address of Physician (or other person) reporting said Birth.
.....

STATE OF MAINE.

I hereby certify that the above birth record is correct to the best of my knowledge and belief.

.....

Clerk of.....

In Providence the items required are left blank, the others being filled in as they appear on the records. Opportunity is thus given for corrections.

NO. 16.

SIZE 7¼ IN. x 8½ IN.

STATE OF NEW JERSEY.

RETURN OF STILL-BIRTH.

SEE PENALTY FOR NON-REPORT.

Place of Birth.....

.....

(If in city, give name, street and number; if not, give township and county.)

Date.....189....

Sex..... *Color*.....

Name of Father.....

Name of Mother.....

Residence of Mother.....

.....

(If in city, give name, street and number; if not, give township and county.)

..... *Age*.....

Period of Utero-Gestation.....

How many previous children.... *No. Living*..

Country of Mother's Birth.....

Country of Father's.....

Cause of Dead-Birth (if known).....

.....

I, as the attendant in charge, certify that the Child was dead before birth.

.....

Attendant.

.....

P. O. Address.

.....

Undertaker.

.....

Place of Burial.

STATE OF NEW JERSEY

RETURN OF STILL-BIR

SEE PENALTY FOR NON-REI

Place of Birth.....

.....

(If in city, give name, street and nu give township and county

Date.....

Sex..... *Color*.....

Name of Father.....

Name of Mother.....

Residence of Mother.....

.....

(If in city, give name, street and nu give township and count

.....

Period of Ultero Gestation.....

How many previous children... .

Country of Mother's Birth.....

Country of Father's..... .....

Cause of Dead-Birth (if known.)...

.....

I, as the attendant in charge, cer Child was dead before birth

.....

.....

P

.....

U

.....

Pla

NO. 17.

SIZE 11 IN. x 5½ IN.

MARRIAGE LICENSE.

DECLARATION OF INTENTION OF MARRIAGE.

STATE OF RHODE ISLAND.

---

1. FULL name of GROOM? *(Expectant.)*

.....

2. Place of Residence?.....

3. Age in years?.....Color?.....

4. Occupation?.....

5. Place of birth?.....

6. Father's Name?.....

7. Mother's Maiden Name?.....

Parents' Birthplace? Father .....Mother.....

Parents' Occupation? Father.....Mother.....

8. No. of Marriage?.....Divorced?.....

.....18.....

I, the expectant groom named in the foregoing declaration, hereby certify that the information given is correct to the best of my knowledge and belief.

Signed in the presence of .....

(Expectant Groom.)

.....

1. FULL name of BRIDE? *(Expectant.)*

.....

(Maiden Name if a Widow.).....

2. Place of Residence?.....

3. Age in years?.....Color?.....

4. Place of Birth?.....

5. Father's Name?.....

6. Mother's Maiden Name?.....

Parents' Birthplace? Father .....Mother.....

Parents' Occupation? Father.....Mother.....

7. No. of the Marriage?.....Divorced?.....

.....18.....

I, the expectant bride named in the foregoing declaration, hereby certify that the information given is correct to the best of my knowledge and belief.

Signed in the presence of .....

(Expectant Bride.)

.....

N. B.—State whether the marriage is the 1st, 2d, 3d, &c., marriage of each. State whether white black, or mulatto. Give middle names in full.

(Reverse on succeeding page.)

(REVERSE.)

OFFICE OF CITY REGISTRAR.

PROVIDENCE, R. I.

No..... .....

I hereby certify that the within license and declaration of intention o
is duly recorded in this office.

.....*City*

I Hereby Certify That the herein described.....

and.....were joined in Marriage by me, in accordance with the laws of the State of Rhode Island, in the City of Providence, this.....day of.....A. D. 189

Attest:.....

DENOMINATION OF CLERGYMAN.....

WITNESSES TO THE MARRIAGE: .....

.....

N. B.—The Clergyman or other authorized person solemnizing the marriage is required to sign this Return and deliver or send it to the Clerk or Registrar of the TOWN OR CITY IN WHICH THE MARRIAGE TAKES PLACE, *on or before the second Monday of the month succeeding the date of the marriage.*

The laws of Rhode Island require at least two witnesses to be present at a marriage, in addition to the parties and the clergyman officiating. Witnesses should be required to sign their names. Names of witnesses cannot be omitted.

NO. 18.

SIZE 8½ IN. x 8½ IN.

These blanks are furnished in books with stubs containing the same items.

STATE OF NEW JERSEY.

MARRIAGE RETURN.

See Penalty for Non-Report Within 30 Days.

☞ Use ink and *write plainly*, especially names.

1. FULL NAME OF HUSBAND..... If colored, so state.

Place of Residence... .....
(If in city, give name, street and number; if not, give township and county.)

2. *Age*.....*years*.....*months*. *Number of his marriage*.....

3. *Occupation*.. .....*Country of Birth*.....

4. *Name of Father*.....*Country of Birth*.....

5. *Maiden Name of Mother*..... *Country of Birth*.....

---

1. FULL MAIDEN NAME OF WIFE,
.....*Country of Birth*.....
If colored, so state.

2. *Place of Residence*.....
(If in city, give name, street and number; if not, give township and county.)

3. *Age, nearest birthday* ..... (If in any trade or business, so state.) .....

4. *Last name, if a widow*..... *Number of Bride's Marriage*.....

5. *Name of Father*..... *Country of Birth*.....

6. *Maiden Name of Mother*..... *Country of Birth*.....

---

1. *Date (in full)*.....18 *Place*.....
(City or township and county.)

2. *In presence of* .....
(Be sure to have witnesses.)
.....

3. *Signature of Minister (what Church Pastor of) or person officiating.* .....

NOTE.—All the facts called for in this blank are important and should be accurately given.

(Reverse on succeeding page.)

(REVERSE.)

Above space to be left blank.

RETURN OF MARRIAGE.

.....*City or Township.*

.....*County.*

Parties Married.....

.....

Date.....

By whom.....

(By Chapter XCII. of the laws of 1889, it is provided that "if the person called upon to solemnize any marriage shall suspect that any male applying to be married is under the age of twenty-one years, or that any female applying to be married is under the age of eighteen years, and no consent of the parent or parents, guardian or guardians, or person or persons under whose care and government such male or female may be, shall be obtained as hereinbefore directed, he shall administer to such male or female, or both, as the case may require, an oath or affirmation that such male is of the full age of twenty-one years, and that such female is of the full age of eighteen years, which oath or affirmation shall be entered upon the back of the certificate of marriage required by law to be made by the person solemnizing such marriage, and shall be his justification should the parties so married, or either of them, deceive him as to his or her age." The following is the correct form of oath or affirmation to be administered in every such case.)

I, ...*the husband within named, do solemnly*.....
that I am of the full age of twenty-one years
(Swear or affirm.)

.....
(Husband's signature.)

Subscribed and.....*before me this*.....*day of*.....*A. D.* 18....

.....
(Sworn to or affirmed.)

.....
(Minister's or Magistrate's signature.)

I, ...*the wife within named, do solemnly*.....
that I am of the full age of eighteen years
(Swear or affirm.)

.....
(Wife's signature.)

Subscribed and.....*before me this*.....*day of*.....*A. D.* 18

NOTE.—Blanks for the Return of Marriages are to be obtained from the local Registrar of Vital Statistics, or in some Cities from the City Clerk. In Townships such Blanks are to be obtained from Assessors. When Blanks have been filled out they are to be returned to the local Registrar, City Clerk or Assessor, as the case may require.

SIZE 18 IN. X 22 IN. (double page).

REGISTER OF DEATHS, STATE OF MICHIGAN.

(Begin each year on a new page and with a new series of Registered Numbers. Register each Certificate immediately, and in the Order of Filing.

Registered Number.	Date of Death. Month.	Date of Death. Day.	Full Name of the Deceased.	Sex.*	Color.*	Single, Married, Etc.*	Age. Years.	Age. Months.	Age. Days.	Place of Death.	Cause of Death. 1. Disease or Injury. 2. Immediate Cause.	Cause of Death. 3. Contributory Cause. 4. Post Mortem.
										Ward No. St.		

* Use abbreviations in these columns:—SEX: M., male; F., female. COLOR: W., white; B., black; M., mulatto; I., Indian. CIVIL CONDITION: S., single; M., married; W., widow or widower; D., divorced. The data on Certificate in regard to age at marriage, number of children, etc., may be entered under name of deceased, if desired, no special column being reserved on Register therefore.

CITY OF DETROIT, DURING THE YEAR .....

(All Certificates of Death [or Transcripts] for each month must be forwarded to the Department of State, Lansing, on the fourth [4th*] day of the following month.)

Birthplace.	Occupation.	PARENTS. Names.	PARENTS. Birthplaces.	Time and Place of Burial or Removal.	Name and Address of Medical Attendant.	Name and Address of Undertaker.	Name and Address of Reporter.
		Father,					
		Mother,					

* The fourth day, not the first, is designated so that *all* deaths for the month can be reported.

The following is the model form furnished by the state board of health of Iowa.

WIDTH OF DOUBLE PAGE 33 IN.

RECORD OF BIRTHS. RECORD OF BIRTHS.

Name of Child

WIDTH OF PAGE 16 IN.

DEATHS REGISTERED IN THE CITY OF FALL RIVER, STATE OF MASSACHUSETTS

Date of Death	Name	Condition	Age Years	Age Months	Age Days	Disease Or Cause of Death	Residence	Occupation	Birthplace	Names of Parent	Date of Record

NO. 22.

SIZE 8¼ IN. x 12¾ IN.

DEATHS REGISTERED IN THE CITY OF PROVIDENCE, R. I.

DATE OF DEATH. 190	NAME OF THE DECEASED.	AGE. Yrs.	Mos.	Days.	PLACE OF DEATH. STREET AND NUMBER.	Sex.	Col.	Condition.	OCCUPATION.	PLACE OF BIRTH.	PARENTAGE. Father	Mother

FOR THE YEAR ENDING DECEMBER 31ST, 190

NAMES OF PARENTS.	PLACE OF BURIAL.	DISEASE OR CAUSE OF DEATH.	PHYSICIAN.	UNDERTAKER.

CITY REGISTRAR'S OFFICE.

Providence, ... *190*

I, ... *City Registrar of the City of Providence, State of Rhode Island, hereby certify that the above is a true copy of the Record of the death of* ..... *, as recorded in Book No.* ..... *, Page* ..... *, of the Records of Deaths in said City of Providence, of which I am the legal custodian.*

Witness my hand and the seal of said City.

..... *City Registrar.*

NO. 23.

SIZE 4 IN. X 6 IN.

STATE OF CONNECTICUT. TOWN OF.....189

MARRIAGE LICENSE

I,.....one of the persons named in the Marriage License to which this is attached, do solemnly swear that the statements therein made are true.

Signed.....

Sworn to before me
this.....day of.....189 Attest.....

.....*Registrar.*

I HEREBY CERTIFY That Mr.....and M.....the above-named parties, were legally joined in marriage by me at.....this.....day of.....189 (Signed).....

Official Capacity.....

Received for record on the day of 189

This copy of Marriage License is correct. Attest:

WRITE LEGIBLY Registrar

(REVERSE.)

THIS CERTIFIES, that the within named parties have declared their intention of marriage, and have complied with the provisions of the laws of the State of Connecticut, relating to the issuing of a marriage license as indicated by attached affidavit.

Attest:.....*Registrar.*

GROOM	BRIDE
Residence of Groom	Maiden name if widow
Age Color	Residence of Bride
Occupation	Age Color
Birthplace of Groom	Birthplace of Bride
1st, 2d, 3d marriage Widowed or Divorced	1st, 2d, 3d marriage Widow or Divorced
Name of Father	Name of Father
Maiden name of Mother	Maiden name of Mother
Nationality of Father	Nationality of Father
Nationality of Mother	Nationality of Mother

NO. 24.

WIDTH OF SHEET 14 IN.

Return of Deaths Registered in the Town of.....during the Month of.....189

CAUSES OF DEATH		Sex		Parentage.		Ages of Decedents.														
Primary	Secondary	No. Males.	No. Females	Native.	Foreign.	Under 1 year.	1 to 2	2 to 3	3 to 5	5 to 10	10 to 15	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 and over.	Age not stated.	Total.

NO. 25 (a).

SIZE 7½ IN. X 8 IN.

STATE OF IOWA — HEALTH DEPARTMENT.

APPLICATION FOR DISINTERMENT PERMIT.

TO THE STATE BOARD OF HEALTH:

Application is hereby made for a permit for the disinterment of the body of .....
[Give full name here, whether it be one, two or three; use no initials.]
now lying in.....Cemetery in the.....
[State whether city, town or township.]
of.....County of.....State of Iowa,
and who died on the.....day of.....18.....aged.....years.....
months.....days, the cause of death being.....
.....and not directly or indirectly by Diphtheria, Membranous Croup, Scarlet Fever, (Scarlatina, Scarlet Rash), Small Pox, Leprosy, Asiatic Cholera, Typhus Fever, or Yellow Fever or other contagious disease, as shown by the certificate of.....attending physician.
[Give full name of physician here.]

The body is to be removed by.....
[State whether by railroad or by private conveyance.]
to.....Cemetery in the.....
[State whether city, town or township.]
of.....County of.....State of
.....for interment.

.....Applicant.

This.....day of.....1....
Postoffice Address.....County of.....Iowa.
Send permit to.....Postoffice.....
County of.....Iowa.

NO. 25 (b).

SIZE 8 IN. X 14 IN.

STATE OF IOWA.

EMBALMER'S DEPARTMENT.

DISINTERMENT PERMIT.

APPLICATION HAVING BEEN MADE for the disinterment of the body of...

.....now lying buried in.....

Cemetery, in the.....of.....C
(City, Town or Township)

.....State of Iowa, who died on the...

.....1.....aged.....years.....months.....days, the

death being.....

and not directly or indirectly by diphtheria; (membraneous croup;) scarl

smallpox; leprosy; Asiatic cholera; typhus fever; or yellow fever; as sh

the certificate of death of said deceased, given by.....attending pl

this is to certify that permission is hereby given for such disinterment and

by.....to.....

Cemetery, in the.....of.....
(City, Town or Township)

County of.....State of.....

effect upon approval by the local board of health of the.....

of.....it being understood and provided that nothing herein

deemed as contravening or in anywise modifying or releasing the Regulatio

State Board of Health governing the Transportation of Corpses or the requ

for a Transportation Permit, and all Transportation Companies and Comm

riers will be governed accordingly; and provided further, that where the

ment is for the purpose of reinterment in another part of the same cemetery

contiguous cemetery, the removal shall not be made by any public conveya

.....Given under my hand and seal of the State Board of H

Des Moines, this.....day of.....

A. D. 1.....

.....

Sec

By.....

The foregoing application for disinterment and removal is hereby approve

local board of health of the.....of.....
(City, Town or Township)

State of Iowa, this.....day of.....1.....

.....

President Local Board of H

[If a City or Town affix corporate seal.]

Attest.....

Clerk Local Board of H

NO. 26.

OHIO ANNOTATED STATUTES, 1900.

SEC. 6921. Whoever erects, continues, uses, or maintains, any building, structure or place for the exercise of any trade, employment, or business, or for the keeping or feeding of any animal, which by occasioning noxious exhalations, or noisome or offensive smells, becomes injurious to the health, comfort or property of individuals, or the public, or causes or suffers any offal, filth, or noisome substance to be collected, or to remain, in any place, to the damage or prejudice of others, or the public, or obstructs or impedes, without legal authority, the passage of any navigable river, harbor, or collection of water, or corrupts, or renders unwholesome or impure, any water-course, stream, or water, or unlawfully diverts any such water-course from its natural course or state, to the injury or prejudice of others, or obstructs or incumbers, by fences, buildings, structures, or otherwise, any public ground or highway, or any street or alley of any municipal corporation, shall be fined not more than five hundred dollars.

SEC. 6922. Whoever builds, erects, continues, or keeps up, any dam or other obstruction, in any river or stream of water, and thereby raises an artificial pond, or produces stagnant water, which is manifestly injurious to the public health and safety, shall be fined not more than five hundred dollars.

SEC. 6923. Whosoever puts the carcass of any dead animal, or the offal from any slaughter-house, or butcher's establishment, packing-house, or fish-house, or any spoiled meat, or spoiled fish, or any putrid substance, or the contents of any privy vaults, upon or into any lake, river, bay, creek, pond, canal, road, street, alley, lot, field, meadow, public ground, market space or common, and whoever being the owner or occupant of any such place, knowingly permits any such thing to remain therein, to the annoyance of any of the citizens of this state, neglects or refuses to remove or abate the nuisance occasioned thereby, within twenty-four hours after knowledge of the existence of such nuisance upon any of the above described premises, owned or occupied by him, or after notice thereof in writing, from any supervisor, constable, trustee, or health officer of any municipal corporation or township in which such nuisance exists, or from a county commissioner of such county, shall be fined not more than fifty dollars nor less than ten dollars, and pay the cost of prosecution, and in default of the payment of said fine and costs, be imprisoned not more than thirty days.

SEC. 6925. Whoever intentionally throws or deposits or permits to be thrown or deposited, any coal dirt, coal slack, coal screenings, or coal refuse from coal mines, or any refuse or filth from any coal oil refinery or gas works, or any whey or filthy drainage from a cheese factory, upon or into any of the rivers, lakes, ponds, or streams of this state, or upon or into any place from which the same will wash into any such river, lake, pond, or stream; or whoever shall, by himself, agent or employe, cause, suffer or permit any petroleum or crude oil, or refined oil or refuse matter or filth from any oil well, or oil tank, or oil vat, or place of deposit of crude, or refined oil, to run into, or be poured, or emptied, or thrown into any river, or ditch, or drain, or water-course, or into any place from which said petroleum, or crude oil, or refuse matter, or filth or refined oil may run or wash, or does run or wash into any such river, or ditch, or drain, or water-course, shall be fined in any sum not more than one thousand dollars nor less than fifty dollars.

SEC. 6927. Whoever maliciously puts any dead animal, carcass, or part thereof, or any other putrid, nauseous, noisome, or offensive substance, into, or in any manner befouls, any well, spring, brook, or branch of running water, or any reservoir of water-works, of which use is or may be made for domestic purposes, shall be fined not more than fifty nor less than five dollars, or imprisoned not more than sixty days, or both.

No. [illegible]

ATLANTA SANITARY RULES.

Rules for the District Inspectors.

[illegible]. The Inspectors shall devote their whole time and attention to t[illegible] of the Sanitary Department, and to the performance of the duties already [illegible] or that may be hereafter prescribed, by the Board of Health; and althou[illegible] hours are allotted to the performance of ordinary duties, each Inspector [illegible] times, be prepared to act immediately on notice that his services are requ[illegible]

[illegible]. The Inspectors shall be quiet, orderly and civil in their condu[illegible] portment. They shall at all times refrain from boisterous manner and fr[illegible] or profane language, and in the performance of duty they shall maintain [illegible] mand of their temper.

[illegible]. The Inspectors are strictly forbidden to drink intoxicating liquo[illegible] duty, or to enter any bar-room or drinking saloon, or house of ill-fame in[illegible] forms, except upon official business. No gaming, playing of cards or [illegible] chance will be allowed. Smoking while on duty is prohibited.

[illegible]. The Inspectors shall not leave the city without the consent of [illegible] of Health. Applications for leave of absence, when desired by the Distr[illegible] tors, shall be made to the Board through the Chief Inspector.

11th. The Inspectors shall not wilfully maltreat or use unnecessary [illegible] a prisoner or to a citizen. They shall not use their canes or pistols excep[illegible] cases and in self-defense.

12th. The Inspectors shall be punctual and prompt in reporting for d[illegible] shall be neat in person, with clothes and shoes clean and brushed. Their [illegible] including overcoats, shall be worn buttoned. An umbrella may be carr[illegible] rain only.

13th. The Inspectors shall carefully inspect every part of their resp[illegible] tricts. They shall keep so informed that they can give particular informa[illegible] requested, respecting the state of the district, including the condition of t[illegible] alleys, lots, cellars, areas, privies, etc. They shall report in writing to [illegible] Inspector, at the time fixed, before every regular meeting of the Board [illegible] They shall make out a weekly pay-roll, showing the amount due each lab[illegible] their control, and submit the same at the approved time to the Chief Insp[illegible]

14th. The Inspectors shall promptly pay over to the Chief Inspector [illegible] that may come into their hands on account of the city, and he shall in[illegible] deposit the same with the City Treasurer. Each Inspector shall make an [illegible] bond, to insure the faithful performance of duty, in the sum of five hundr[illegible] All purchases made by Inspectors on account of the city shall be made b[illegible] prescribed and printed form, which shall be returned with the bills as [illegible] Any abuse of this privilege on the part of the Inspectors shall subject th[illegible] to dismissal from service.

15th. The Inspectors shall not leave their respective districts whi[illegible] without the permission of the Chief Inspector, except upon strictly officia[illegible] or in going to dinner, for which one hour daily will be allowed.

16th. The Inspectors shall walk their districts while on duty. No l[illegible] loitering on street corners or at any other places will be tolerated. Co[illegible] with each other or with any other person, except on official business, is [illegible]

17th. Failure of the Inspectors to be present at roll-call for two o[illegible] occasions, without a good and valid excuse, shall subject the offender t[illegible] dismissal.

18th. The Inspectors shall strictly and promptly obey all orders is[illegible] through the Chief Inspector, or, officially, by the Board of Health. If [illegible] issued by the Chief Inspector should appear to the District Inspectors un[illegible] improper, formal complaint in writing may be made directly to the Board [illegible] But no refusal to obey an order will be tolerated, nor will unnecessary d[illegible] inattention be permitted.

19th. The Inspectors shall not use their office with malice, to oppress [illegible] or annoy any person. Any Inspector violating this rule shall be dism[illegible] service.

20th. Neither the Chief Inspector nor any of the District Inspecto[illegible] vocate the claims of any candidate for municipal office. The Inspecto[illegible] servants of all the people, and any partisanship manifested in any politic[illegible] or in any election held within the city, whether for State, county or [illegible] officers, will not be tolerated.

STANFORD LIBRARIES

NO. 28.

SIZE 7 IN. x 8 IN.

DEPARTMENT OF HEALTH.

OFFICE HEALTH COMMISSIONER.

BUREAU SANITATION. *Buffalo, N. Y.* 189

Premises No *Street.*

Tenant *No* *Street.*

Owner, Agent *No.* *Street.*

COMPLAINT.

COMPLAINANT.

NO. 29.

SIZE 3½ IN. x 8 IN.

BOARD OF HEALTH, CITY OF NEW HAVEN SANITARY INSPECTION.

No.....Street.

.....

Inspected.....189 .

Notice.....189 .

Condition.....

.....

.....

Advised.....

.....

.....

Time.....Days.

.....Inspector.

The Premises No.....Street of which you are owner, agent, tenant, is in an unsanitary condition on account of.....

.....

Unless the nuisance is abated in.....days, by...

.....

it will be reported to the Board of Health for immediate action.

To.....

.....

Date.....189 . *Sanitary Inspector.*

NO. 30.

The following blank is in use in Asbury Park, N. J. These blanks are books, one book for each street and one blank for each lot or separat Each blank has four pages and the books measure seven inches by eigh half inches. The printing and binding (twenty-seven books) of these $30 per 1,000:

RECORD OF SANITARY INSPECTION.

No.....Stree
Owner..... Address.....
Agent.....

SITE OF HOUSE.

1. Size of lot.....feet x.....feet. Area of lot.....
   Area covered by buildings.....
2. Has lot been filled in?.....
3. Elevation of house sill above curb.....
4. Ground-water level below curb.....
5. Height of buildings on adjoining lots.....
6. Yard.....
7. Privy-vault: size.....x.....; distance from privy-vault to dwellin feet; distance from privy-vault to well.....feet; constructio vault.....
8. Catch-basin: size.....x.....x.....; size of grating..... how covered.....; is ventilation adequate?..
9. Cesspool: size, constuction, location and ventilation.....
10. Water supply.....; analysis of well-water.....
11. Stable: .....; number of stalls.....; how floored..... disposal of fluid excrement..... storage of solid excrement..... manure receptacle.....; size..... cover.....
12. Chickens kept on premises?.....
13. Garbage: how stored?.....

HOUSE.

14. House erected.....
15. House used for boarders? .....; for other business? ....
16. House faces.....; sun exposure.....
17. Number of sleeping-rooms.....
18. Rooms without windows.....
19. Heating.....; has furnace an air-tight fresh air box?.....
20. Lighting.....
21. Number of stories high.....
22. Material of construction..... sheathed and covered with building paper?.....
23. Fire escape.....

24. Roof.....
25. Back dwelling on lot.....
26. Foundation: thickness.....; damp?.....; cause.....,
27. Cellar: how floored.....; under all of house?.....; outside entrance? .....; number and size of windows.....; is cellar dry or damp? .....; is ground-water level below cellar bottom?..... is cellar well ventilated?.....

PLUMBING.

28. Water-closets: number.....; located..... style .....; condition..... windows in water-closet apartment.....; is apartment used for sleeping-room?.....
29. House drain: material..... size.....; fall.....
30. Trap on main drain.....
31. Inlet for fresh air.....
32. Are all fixtures trapped?.....; traps vented?.....
33. Premises connected with street sewer?.....

VITAL STATISTICS.

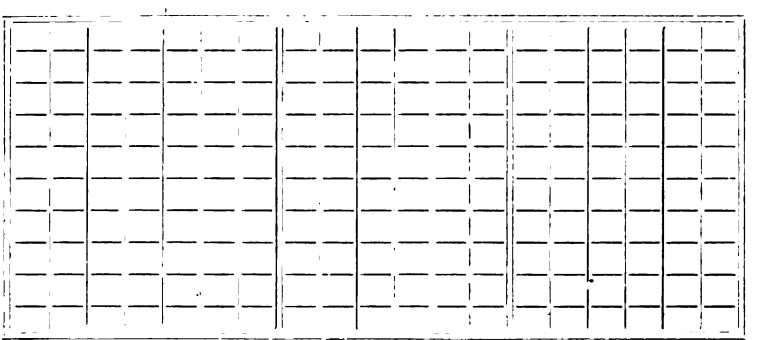
34. Population of house.....
35. Number of families.....
36. Diseases reported during past year..... .....
37. Diseases reported during past ten years ....
38. Deaths during past year..... .....
39. Deaths during past ten years..... ....

Inspector.

PLAN OF PREMISES.

SCALE.—One inch, 25 feet; one-fifth inch, 5 feet. Each square represents 5 square feet.

LETTERS INDICATE AS FOLLOWS: W, well; C, cistern; P, privy-vault; D, drain (dotted line shows course of drain); L, leaching cesspool; B, brick cesspool; C B, catch-basin.



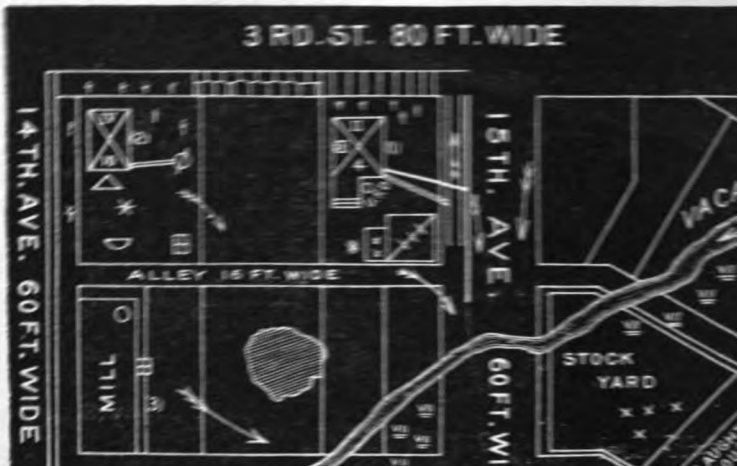
NO. 31.

Form proposed by the Minnesota State Board of Health.

The following model plat for recording facts of inspection can be
pencil on a half sheet of letter paper making a convenient record wh
changed as occasion requires.

To be used in making and recording a sanitary survey of a farm, lot
the case may be), as parts of a township, village or city survey. (The
treated and described below enable the record to be made with the
notes.)

No. or Plat ——



1. House; Roman numeral (*e. g.*, II) indicates adult population. Arabic (*e. g.*, 4), child population. Number in parenthesis (*e. g.*, I), reference number of house.
2. Well; if used for drinking purposes, mark u. f. d.
3. Water or earth closet.
4. Privy, with ordinary vault; see 23 below.
5. Cistern; if used for drinking purposes, mark u. f. d.
6. Cesspool and drain from house.
7. Garbage heap.
8. Barn; marks on diagonal indicate horses and number of same.
9. Shed; marks indicate cattle and number of same.
10. Manure heap.
11. Pig pen; numeral (*e.* cates number of occupants.
12. Plank sidewalk.
13. Stone, brick or concret
14. Water main and conne house; arrow indicates directi
15. Sewer and connection w arrow indicates direction of fl
16. Swamps or wet ground
17. Flowing stream.
18. Stagnant pool.
19. Trees.
20. Arrow indicates direct face drainage.
21. U. F. D., used for dri poses.
22. Ft. D., followed by nu cates number of feet deep.
23. W. T., means water ti

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

NO. 32.

This form is used in North Carolina and also in Brunswick, Ga.

SAMPLE PAGE OF INSPECTION BOOK.

1893–'94.			1	2	3	4	5	6	7	REMARKS.
April	1	124 Wolf Street,	b	a	a	b	c	a	a	1. Too much litter and trash. 5. Very foul.
May	3	" "	a	a	a	a	b	a	a	5. Improved but not clean yet.
June	2	" "	a	a	a	a	a	a	a	
July	2	" "	b	a	a	a	b	a	a	1. Rank weeds. 5. Not enough dry earth used.
Aug.	1	" "	a	a	a	a	a	a	a	
Sept.	2	" "	b	a	a	a	a	a	a	
Oct.	1	" "	a	a	a	a	a	a	a	
Jan.	3	" "	a	a	a	a	a	a	a	
April	1	T. H. Jones,	c		c		x		b	1 and 3. Dirty pig-pen too near well. 5. Very foul, never cleaned.
May	3	" "	b		b		a		b	1. Pig-pen improved, floor raised, so that can be raked under.
June	2	" "	a		a		a		b	
		And so on down.							-	

NOTE.— By allowing nine lines to each lot there will be a line for each one of the inspections required by the ordinance — monthly from April to October, inclusive. "124 Wolf Street" represents a complete establishment, "T. H. Jones" an humbler one with no stable or other out-building and no sink.

The inspector should carry this book with him when making his rounds and make his notes on the spot.

FORM NO. 2.

(To be printed or written on first fly-leaf of Inspection Book).

Column No. 1 indicates condition of Premises [other than below].
" " 2 " " Stable.
" " 3 " " Well or Pump.
" " 4 " " Sink.
" " 5 " " Privy.
" " 6 " " Out-building.
" " 7 " " Residence.

A indicates Good. B indicates Fair. C indicates Bad. X indicates a serious menace to health.

NO. 33.

SIZE 8 IN. X 10 IN.

BOARD OF HEALTH, 12 BEACON STREET,
BOSTON, ...189

To.....
of Boston, in the County of Suffolk, and Commonwealth of Massachusetts:—

The Board of Health of said City of Boston hereby order you to remove, at your own expense, within.....days from service of this notice, a nuisance, source of filth and cause of sickness, found on certain private property, of which you are the owner and occupant, to wit:.....
.....
situated on and appurtenant to the premises numbered.....
.....
in said Boston; and which said.....
.....
said Board of Health have adjudged to be a nuisance.

By order of the Board of Heath,

.....
Secretary.

[Reverse has blanks for record of service.]

NO. 34.

Size 8½ in. x 14 in.

The following is the form used in Providence under the Rhode Island

[FACE.]

THE CITY OF PROVIDENCE.

No.

In Board of Aldermen,

Ordered, that

being the owner or occupant of premises situated

in the City of Providence, Rhode Island, remove at ow
certain nuisance, source of filth, filth, or cause of sickness, to wit:

found on said premises, within twenty-four hours
after service of this notice of said order.

Clerk of the Board of

[REVERSE.]

State of Rhode Island,
Providence, sc.,
City of Providence.

I have made service of the within notic
by leaving a copy thereof personally with the said
at the last and usual place of abode of said
within this state, by reading the same in the presence and hearing of sa
of
the authorized agent of said
on the day of A. D. 189 at
o'clock, M.

[FACE.]

Notice of Nuisance.

City of Providence.

Board of Aldermen.

To

Date of Service o'clock, M.
189

NO. 35.

The Ohio nuisance law appears to be a very effectual one and the state board of health has prepared a blank form of order for the use of local boards in that state in abating nuisances.

SIZE 4 IN. x 9½ IN.

[FORM II. TP.]

No. *189*

NOTICE TO ABATE NUISANCE.

sent to .....

residing at .....

To abate nuisance caused by .....

.....

No. .....

BOARD OF HEALTH OF ..... TOWNSHIP, ... CO., OHIO.

NOTICE TO ABATE NUISANCE.

To ..... *owner, agent or tenant:*

You are hereby notified and required to abate within ..... *days from the date of the receipt of this notice, a nuisance on property situated* .....

said nuisance being caused by .....

The nuisance must be abated by .....

[Name manner in which nuisance must be abated.]

.....

CLERK OR HEALTH OFFICER.

NO. 36.

SIZE 7 IN. x 8½ IN.

☞ Contractors must present their bills within Five Days from the completion of the work. ☜

Philadelphia, ... 18

..... is hereby authorized and directed to abate or remove the within described nuisance in accordance with the rules of the Board of Health.

Health Officer.

..... Ward,

No .....

Nuisance .....

Inspector — District No. .

..... 18

By order of the Board of Health, the Health Officer is directed to have the within-described nuisance abated or removed.

Chief Clerk.

Inspector.

Dist. No. ....

(REVERSE.)

No. ..... Ward, ...

☞ A LIST OF LICENSED CLEANERS CAN BE SEEN ON APPLICATION AT THE HEAL

HEALTH OFFICE, PHILADELPHIA, ...

To .....

owner, agent, or occupier of premises situated .....

You are hereby notified and required to have removed within ..... from the date of the service hereof, a certain Nuisance on the above-descr erty, arising from .....

which Nuisance has been declared to have a tendency to endanger and be p to the public health. On failure to do and perform which, the said Nui be removed at your expense, and a lien entered agreeably to the provisi Act of Assembly.

By order of the Board of Health.

Attest: ..... Chie

Clerk.

[Extract from Act of Assembly.]

NO. 37.

SIZE 8 IN. x 10½ IN.

IN BOARD OF HEALTH,

BOSTON,.....189

WHEREAS, upon due examination it is adjudged by this Board that a nuisance exists on premises.....
.....
consisting of.....
.....
rendering the same unfit for occupation as a dwelling place, therefore

ORDERED, That the tenants of said premises be notified to vacate the same within.....days from service of notice hereof.

A true copy. Attest,

.....Secretary.

To.....
.....
tenants of premises No.....

In compliance with the above adjudication and order you are hereby ordered to vacate said premises within.....days from service hereof.

.....Secretary.

A true copy. Attest,

..... Constable.

NO. 38.

SIZE 8½ IN. x 11 IN.

CITY OF CAMBRIDGE.

OFFICE OF

[L. S.] BOARD OF HEALTH,

CITY HALL.

.....189

M.....
.....

SIR:

In the opinion of this Board the privy vault maintained upon your premises situated on.....in said Cambridge, and numbered.....thereon, said street being a public street wherein there is a public sewer opposite your said premises.....
.....
....., is injurious to the public health.

In accordance with the provisions of Chapter 74 of the Legislative Acts of the year 1890, said privy vault is hereby declared to be a nuisance, and the further continuance thereof is forbidden. You are therefore

ORDERED.

To remove the aforesaid nuisance at your own expense within..... after service of notice of this order.

By order of the Board of Health,

.....Clerk.

MIDDLESEX, ss. CAMBRIDGE,.....189

I have this day served the foregoing notice by delivering in hand to the said.....by leaving at the last and usual place of abode in said Cambridge, of the said
.....
a true and attested copy of the same.

.....

NO. 39.

SIZE 8 IN. x 10 IN.

APPLICATION FOR DRAINAGE PLUMBING PERMI

No.....

No. of Building Permit..... DENVER, COLO.,.....

APPLICATION IS HEREBY MADE FOR PERMIT FOR DRAINAGE PLUMBI

Class of Buildings,

No. Str

Lot, Block,

Owner, Address,

Plumber, Address,

Number.	W. Closet.	Wash Bowls.	Bath Tubs.	Sinks.	Wash Tubs.	Urinals.	Stop Hoppers.	Grease Traps.
Basement. .								
Yard.								
1st floor....								
2d floor.....								
3d floor.....								
4th floor....								
5th floor....								
6th floor....								
7th floor....								
8th floor....								

All work, materials, and construction to be strictly in accordance with the Rules and City Ordinances pertaining to Plumbing and House Drainage of the City of Denv

No. 40.

SIZE 8½ IN. x 14 IN. (Four pages.)

PLAN No.....

Street No.....

CITY OF PROVIDENCE.

To the Inspector of Plumbing:

As required by Chapter 661 of the Ordinances, the following PLAN is this day, ...189...submitted for approval; and we, the undersigned, do hereby agree to do all drainage and plumbing in the building specified herein according to this PLAN and in accordance with the ordinance in relation to plumbing.

Location.....Street.

Owner....., Address.....Street.

Master Plumber....., Address.....Street.

Architect....., Address.....Street.

Estimated Cost of Plumbing.....

Class of Building,.....Old or New,.....Number of Stories.....

How is building to be occupied?.....

Where does the Drain Pipe Discharge?.....

Is the Drain Pipe above or below the basement floor?.....

Size of Drain Pipe in cellar,.....inches; Size of Soil or Waste Pipe,.....inches.

Where does the Air Inlet Pipe open? In Court-Yard or at Sidewalk?.....

Is there Underdrainage?.....How does it connect with Sewer?.....

WATER CLOSETS.	YARD.	BASE-MENT.	1st FLOOR.	2d FLOOR.	3d FLOOR.	4th FLOOR.	5th FLOOR.	6th FLOOR.
Pattern or Name of.								
How Supplied with Water.								
Is Apartment Ventilated? If so, state if it is by Air Shaft or Window.								
How far are Traps from Vertical Pipe?								
How are Tank Overflows Trapped?								

THE ANSWERS TO THESE MUST BE WRITTEN IN EACH FRAME. THE WORD OR SIGN "DITTO" MUST NOT BE USED.

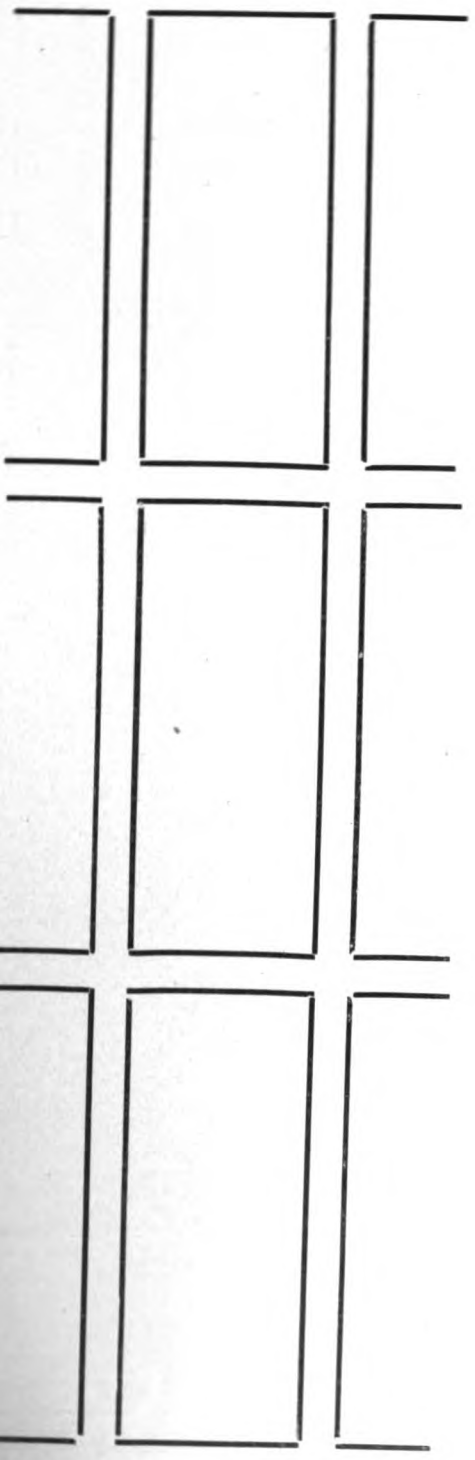
		How Many.	Kind of Trap.	Soil or Waste Pipe.				Air Pipe.				Safe Waste Pipe.		
				Size of Soil or Waste Pipe.	Weight of Pipe.	Material of Pipe.	Connected with Sewer or Cesspool.	Is there a separate one?	Size.	Material.	Where does it lead to?	Is there any?	Material.	Where does it Discharge?
Water Closets.	Basement													
	1st Floor													
	2d Floor													
	3d Floor													
	4th Floor													
	5th Floor													
Wash Basins.	Basement													
	1st Floor													
	2d Floor													
	3d Floor													
	4th Floor													
	5th Floor													
Tubs.	Basement													
	1st Floor													
	2d Floor													

	Rain Conductors.	Refrigerators.	Slop Hoppers.	Urinals.	Sets of Wash Tubs.	Sinks.
Basement						
1st Floor						
2d Floor						
3d Floor						
4th Floor						
5th Floor						

Approval recommended

Date

Inspector of Plumbing.



INSPECTOR OF PL

OF THE

CITY OF PROVID

Plan of Plumbing and

PLAN NO.....

No.....

Filed .....

Inspected.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Final Inspection shows that
has been done in accordance
Plan and the Rules and Regulat

Inspector of P

No. 41.

SIZE 4 IN. x 5½ IN.

BUREAU OF HEALTH.

ORIGINAL.

PLUMBING CERTIFICATE.

No.....

Denver, Colo.,.....189....

I hereby certify that I have on this day examined the plumbing of house owned by.....Lot.....

Block.....Add.....Street.....

between.....

and find that the work has been done according to requirements of the City Ordinance in relation to plumbing.

.....

Health Commissioner.

.....

Plumbing Inspector.

NO. 42.

SIZE 4½ IN. x 8 IN.

INSPECTOR OF PROVISIONS.

NO.

Providence,..... 189

Quantity, ...

Kind,.....

{Owner,.....

{Address,.....

{Consignee,.....

{Address,.....

Private marks,.....

Date of arrival,.....

.....

.....

.....

CITY OF PROVIDENCE—HEALTH DEPARTMENT.

INSPECTION OF PROVISIONS.

NO.

.....18

I hereby certify that on the.....day of.....189 , I seized and condemned at .....

.....

the property of.....

of.....and consigned to .....Providence, R. I.; said property being.....

and unfit for food.

.....

Inspector of Provisions.

NO. 43.

SIZE 7 IN. x 8 IN.

APPLICATION FOR LICENSE TO SELL MILK.

CITY OF MINNEAPOLIS, MINNESOTA.

Application of..... .....to the City Council of the City of Minneapolis, for a License to sell milk in said city.

1st. Name of Applicant and residence.....

.....

2d. Location of dairy from which applicant obtains his milk.....

3d. Name of owner of such dairy.....

4th. Number of cows in dairy from which applicant obtains his milk.....

5th. Manner of disposing of milk .....

Date..... .....189.. Signed.....

No. of Application..... .....

(OVER.)

(REVERSE.)

APPLICATION FOR LICENSE TO SELL MILK.

Date of Filing Application with Commissioner of Health.....day of.....189

Presented to City Council by the Commissioner of Health.....day of.....189

Recommended.....

.....

.....

Name of Owner.....

General condition of dairy and herd.....

.....

.....

No. of cows inspected.....

No. of cows licensed and tagged.....

.....

No. of cows condemned.....

Referred to Committee.....189..

Reported.....189..

Passed.....189..

NO. 44.

SIZE 7 IN. x 14 IN.

APPLICATION FOR LICENSE TO SELL MILK IN THE CITY OF BOSTON DURING THE YEAR ENDING MAY 31st, 1900.

Name of applicant.....
Residence (street and number, town).....
Place of business.....
Number of wagons used in delivery of milk.....
Number of drivers employed.....

NAMES OF DRIVERS.	RESIDENCES.
	.....
	.....
	.....
	.....
	.....

Section supplied.....
Amount of Milk raised, (quarts).....
Number of cows kept..... } If any, fill out Form 3.
Amount of milk bought (quarts).....
Of whom bought.....
Where delivered by him.....
Hour delivered.....A. M.....P. M.
Where stored and handled after delivery.....
Whether mixed, handled, or stored where cows, horses, or other animals are kept, or where manure is stored.....
Whether mixed, handled, or stored in rooms used for domestic purposes or sleeping rooms.....
Location of milk room.....
How drained.....
Whether walls are tight and easily cleaned.....
Whether floor is tight and easily cleaned.....
Whether appliances are at hand for washing or sterilizing all utensils.....
.....
Whether any water-closet, urinal or privy is located in the room.....
Whether ice-box or refrigerator drained, and how.....
.....

The above is a correct statement.

Signature,.....

Witness.....

Boston.....

License Issued.....

Number of License.....

NO. 45.

SIZE 7 IN. x 10½ IN.

APPLICATION FOR REGISTRATION AS A DEALER IN MILK AND FOR LICENSE TO SELL MILK IN A STORE IN THE CITY OF BOSTON.

Name of applicant (if a partnership, the name and address of each member must be given).

.....Residence.....
.....Residence.....
Kind of store (bakery, provisions, groceries, etc.).....
Place of business, No.....Street.
District.....Amount sold per day (quarts).....
From whom purchased.....
Time received.....
Whether kept in a separate covered cooler or refrigerator.....
Whether cooler or refrigerator is drained and how.....
.....
Where and how the measures are washed.....
.....
Whether there is a urinal or water-closet in the store.....
Whether any part of the store is used for domestic purposes or as a sleeping-room.....

The above is a correct statement.

Signature.....
Witness.....
Boston.....
License issued.....
Number of License.....

NO. 46.

HEALTH DEPARTMENT OF THE CITY OF NEW YORK,
CRIMINAL COURT BUILDING,
NEW YORK,....., 189..

Permit No.....

.....is hereby authorized to sell Milk, Fresh and Condensed, at No.....under the laws, rules and regulations of the Board of Health of the Health Department of the City and County of New York.

This permit is not transferable to any person or location other than above, and must be kept posted at all times in a conspicuous place in this store, and is revocable at the pleasure of the Board.

By order of the Board of Health,

CHARLES G. WILSON,
President.

EMMONS CLARK,
Secretary.

Countersigned, EDWARD W. MARTIN,
Chief Inspector, Food Division, etc.

For Wagons:

HEALTH DEPARTMENT OF THE CITY OF NEW YORK,
CRIMINAL COURT BUILDING,
NEW YORK, ..., 189..

Permit No.....

.....residing at .....is hereby authorized to sell Fresh and Condensed Milk from Wagon No....., in the City and County of New York, under the laws, rules and regulations of the Board of Health of the Health Department of said City and County. This permit is revocable at the pleasure of the Board.

By order of the Board of Health,

EMMONS CLARK, *Secretary.* CHARLES G. WILSON, *President.*

Countersigned, EDWARD W. MARTIN, *Chief Inspector, Food Division, etc.*

This permit is void if used for any cart except the one designated on the face.
Driver's name.....
Residence.....

Not transferable.

NO. 47.

SIZE 4 IN. X 6½ IN.

Ins.....Date..... Time..... Lab. No.....

Name.....

Address.....

Attendant.....

Marks on Can..... Size of Can..... Approx. Amt. in Can.....

Tag? YES NO. Duplicate Given? YES NO. Milk Cream

No. of Wagon..... License No..... Ward.....

Where Taken..... .....

Remarks.....

.....

Specific Gravity..... Butter Fat..... Total Solids.....

(REVERSE.)

THE MILK ORDINANCE REQUIRES Milk to contain at least three per cent. of butter fat; this means three pounds of butter fat in one hundred pounds of milk.

"Skim" milk may be sold if the can, jar, glass or vessel in which the milk is kept is marked with a "skim" milk tag in plain sight where customers may see it.

Cream must contain at least twelve per cent. of butter fat; this means twelve pounds of butter fat in every one hundred pounds of cream.

No "whole milk," "skim milk" or cream may be sold which contains water, color, preservative, soda, salt or *any other* adulteration.

THIS SLIP IS A RECEIPT FOR YOUR SAMPLE and you cannot get your test without it, unless it has been destroyed or lost, when satisfactory evidence of the fact must be given. No results of tests will be given by telephone; either present this slip for your test or mail with it a two cent stamp enclosed, to Room 411, City Hall, and result of test will be sent you.

Samples of milk or cream will be received for testing between nine o'clock in the morning and four o'clock in the afternoon. A half pint of milk or cream is required for a test. All testing is done free of charge.

For further information, address

E. B. STUART,
Superintendent Milk Inspection,
Room 411, City Hall.

NO. 48.

SIZE 3¼ IN. x 10 IN.

WARNING NOTICE TO SELLERS OF ILLEGAL MILK

Name.....

Address.....

Character of milk sold.....

.....

Date.....189..

No. of Notice.....

DEPARTMENT OF HEALTH.

CITY OF MINNEAPOLIS.

No..... *Minneapolis, Minn.*,.....189...

You are hereby notified that a sample of milk recently obtained from you has been found on analysis to be of a character declared by law to be illegal. You are respectfully notified that the sale of such milk, or the offering or exposing or delivering of such milk for sale or consumption renders you liable to the penalties provided by the Ordinances of the City of Minneapolis.

Further information will be furnished you on personal application to this office.

Respectfully,

To..... .....

Commissioner of Health.

.....

NO. 49.

SANITARY INSPECTION OF TENEMENT OR LODGING HOUSE.

Date of inspection..... .....189....

1. Street.....No.....
2. Owner, Agent.....Address.....
3. Condition of Street. Paved or Unpaved.
4. Condition of yards and courts: Clean, Unclean; rubbish, ashes, garbage, wet, damp, dry.
5. Barn: Clean, unclean, wet, damp, dry, sewered. Manure Box: Clean, unclean, covered, or uncovered.
6. Outhouses: Clean, unclean, whitewashed, not whitewashed.
7. Animals: No.....Nature.....
8. Basement or Cellar: Cemented, uncemented, wet, damp, dry, clean, rubbish, ashes, filth, lighted, ventilated.
9. Apartment No. 1. Living rooms.....; Sleeping rooms.....; Ventilated; No. of occupants.....; Color.....; Nationality..... Air space.....

. . . . . .

29. Apartment No. 21. Living rooms.....; Sleeping rooms.....; Ventilated; No. of occupants.....; Color.....; Nationality.....; Air space.....
30. Sickness in house; what diseases.....
31. Sickness during 12 months; what diseases.....
32. Deaths during past 12 months; what diseases.....
33. Water supply.....; Source of contamination.....
34. Janitor. Night lights. Gong. Metal receptacles for refuse, etc.
35. Plumbing: Yard.....
    Basement.....
    1st floor.....
    2d floor.....
    3d floor.....
    4th floor.....
    5th floor.....
    Conductors discharge.....
36. Sanitary needs; observations.....

.....

NO. 50.

SIZE 8½ IN. X 14 IN.

REPORT OF INSPECTION OF DAIRY FARM.

HEALTH DEPARTMENT, DISTRICT OF COLUMBIA.

WASHINGTON,.....

To the Health Officer:

SIR:—

I respectfully submit the following report upon an inspection of the dairy farm of....., located.....

BUILDING.

Brick.....Frame.....Stories high.
Condition.....
Is any part of it used for any other than dairy purposes?.....
If so, specify, in the space for remarks, what parts of it are so used, and the purposes for which used.
Room for Cattle.
Size,.....long,.....wide,.....high.....
Floor. Kind.....
Condition.....
Is it properly sloped and guttered?.....
What disposition is made of the drainage?.....
.....
Ventilation and lighting. How accomplished?.....
.....
.....
Windows. How many?.....
Location.....
.....
Size.....
.....
Are windows glazed?.....
Ventilators. How many?.....
Kind.....
.....
Location.....
.....
Size.....
.....
Doors. How many?.....
Location.....
.....
Stalls. Where located?.....
.....
How many?.....
Size of each?.....wide.....long.....
.....wide.....long.....
Are animals of any kind other than cattle kept in this room?.....
If so, specify how many, and what kind.....
Feeding troughs or boxes. How many?.....
Kind.....
Location.....
Condition.....
Water troughs. How many?.....
Kind.....
Location.....
Condition.....
If water troughs are not used, how are cattle watered?.....

Source of water supply.
If from well, state location.....
Approximate depth.....feet, and construction.....
.....
Location of well with reference to nearest privy. State distance and slope of ground.....
Location of well with reference to place where dung is deposited. State distance and slope of ground.....
Has water any perceptible odor, color or taste?.....
If so, describe.....
Receptacles for dung and other refuse. How many?.....
Kind.....
Location.....
Condition.....
Receptacles for milk. How many?.....
Kind.....
Condition.....
What provision is made for cleaning?.....
Is milk cooled immediately after milking?.....
If so, how?.....
.....

BARN-YARD.

Size.....long.....wide.....
Is it properly graded?.....and drained?.....
Is it paved.....
What disposition is made of the drainage?.....
.....
What is its condition as to cleanliness, at time of inspection?.....
.....

PASTURE.

Size of.....
Location of.....
Condition of.....
.....
Is it supplied with drinking water for cattle?.....
If so, from what source?.....

CATTLE.

How many milk cows are usually kept?.....
How many other cattle, if any, are kept in the same stable?.....
Kind of milch cows used.....
Condition of cows at time of inspection. General condition.....
.....
Cleanliness, etc.....
Character of feed.....

PRIVY ACCOMMODATIONS.

How is human excreta from the premises disposed of?.....
.....
Location of privy, if any.....
Construction of privy.....
.....
.....

SEWER AND WATER.

Is a public sewer available for premises?.....
If so, have sewer connections been made?.....
Is a public water main available for premises?.....
If so, are the premises connected therewith?.....

REMARKS.

.....
.....
.....
.....
.....
.....

Inspector.

NO. 51.

SIZE 44 IN. X 11 IN.

PHYSICIAN'S MEMORANDA.

Date of Report.....189....

Name.	Date When Taken Sick.	Sex.	Age.
1			
2			
3			

No. and Street.	Where Children Attend School.
1	
2	
3	

Disease.	Date First Case Reported.
1	
2	
3	

Remarks.

REPORT OF SICK CASES.

Every case of Smallpox, Asiatic Cholera, Diphtheria, Scarlet Fever (Scarlatina), Measles, Typhoid (Enteric) Fever, Typhus (Ship) Fever, or other dangerous contagious diseases to be reported to the Commissioner of Health within twenty-four hours.— Maximum penalty for not reporting $100.00.— General Ordinances of the City of Milwaukee.

BE CAREFUL TO FILL ALL BLANKS AND MAKE CORRECT DATES.

TO THE COMMISSIONER OF HEALTH — CITY OF MILWAUKEE:

SIR:— I hereby report the following sick cases as required by law:

Name in Full.	Date When Taken Sick.	Sex.	Age.	Married or Single.	Name of Disease.
1					
2					
3					

No. and Street.	Ward.	Place Where Children Attend School.	How Long After Disease Appeared was Antitoxin Used.	Remarks.
1				
2				
3				

Date_____189 Signed_____M. D.

☞ This blank to be detached and sent by mail to the Commissioner of Health or left at the Health Office within 24 hours; as required by law.

P. O. Address_____

NO. 52.

POSTAL CARD.

Diseases to be Reported: Diphtheria, Measles, Membranous Croup, Puerperal Fever, Scarlet Fever, Smallpox, Typhoid Fever, Whooping Cough. Optional — Tuberculosis.

NOTE.— Where the Attending Physician will undertake to enforce necessary measures against the spread of contagion in a case of any of the above-named diseases, the intention should be indicated by writing in the word **assume** in Entry No. 8. If this be done the DEPARTMENT will not placard the premises — except in Smallpox. If it is proven that efficient precautions are not being enforced, the premises will be taken in charge of, placarded and quarantined by the DEPARTMENT — Tuberculosis excepted.

If the Physician does not see fit to assume this responsibility, the word **decline** should be written in the blank space, when the DEPARTMENT will placard and quarantine as may be necessary for the protection of the neighborhood. Absence of any indication will be construed as declining the responsibility and the DEPARTMENT will take action accordingly.

Where the responsibility is assumed, the Physician must cause neighboring families to be fully warned against the disease and must prohibit members of the infected family from exposing others to the risk of infection.

1 Chicago.....1.....Case of.....

2 No..... .....Ward

Avenue, Boulevard, Court, Place, Street.

3 Case.....connected with Milk Shop or Depot, Laundry, Shop, other business place. If not so connected write in blank space the word NOT.

4 Name of patient.....

5 Age.....years.....months. Color.....Sex.....

(If the Patient had lived outside Chicago within the last 30 days, state below where and date of return.)

6 Returned from.....on the.....

Name of place and State. Date of return.

7 .....

In Puerperal Fever — where Midwife had been in attendance, give her name and address on above line.

8 See note above.— I.....the responsibility of preventing spread of contagion from this case.

.....M. D.

Address.....

NO. 53.

POSTAL CARD.

Physicians are required by law to report within twenty-four hours all cases of *contagious* or *pestilential diseases*, namely: Smallpox, Epidemic Cholera, Epidemic Dysentery, Scarlet Fever, Diphtheria, Typhoid Fever, Puerperal Fever, Measles, Erysipelas, Whooping Cough, Hydrophobia, giving name, age and residence. See Revised Ordinances, Sec. 69.

To Health Division. Name.	Age.	Residence Street and Number.	Diphtheria	Scarlet Fever.	Typhoid Fever.	Measles.	Erysipelas.	Whooping Cough.	Miscellaneous Diseases.

Cleveland, Ohio,

.....*day of*.....*1895.*

.....*M. D.*

NO. 54.

POSTAL CARD.

San Francisco, ...*1893.*

The Board of Health is hereby notified that.....

.....*age....years, living*

at No......

is ill with.....

.....*M. D.*

Order No. 2313—Sec. 6. It shall be the duty of each physician in this city and county to report to the Health Office in writing, every patient he shall have laboring under Small Pox, Asiatic Cholera, Diphtheria, Scarlet Fever, or other contagious disease, immediately after he shall be satisfied of the nature of the disease. He shall also report to the same officer every case of death from such disease.

Any person who shall violate any of the provisions of this Order shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than five hundred dollars, or by imprisonment in the County Jail for not more than six months, or by both such fine and imprisonment.

This law will be strictly enforced.

.....

Health Officer.

NO. 55.

SIZE 5½ IN. x 8 IN.

[FOR TYPHOID FEVER.]

EVERETT, MASS. 189

TO THE BOARD OF HEALTH:

In the case of.....

.....

Disease.....

Date of first symptoms:.....

Has the person been out of town within three weeks? (Visit or at work.)

.....

.....

Has the person drunk any well or spring water within three weeks?

.....

.....

From whom is milk bought?

.....

Is this the only milk used?

.....

If at work out of town where are dinners obtained?

.....

Has the person visited any one sick with fever?

.....

NO. 56.

SIZE 8 IN. X 11 IN.

MOBILE, ALA., ... 187 ....

DR. T. S. SCALES, HEALTH OFFICER.

DEAR SIR: I most respectfully report a case of Yellow Fever in the person of .....

Sex. ; Color, ; Age, ;

Street.....

Contracted when.....

Contracted where.....

REMARKS.

.....

.....

Very Respectfully,

.....M. D.,

Attending Physician.

OFFICE OF THE BOARD OF HEALTH,
MOBILE, ALA., Sept. 26th, 1878.

DEAR DOCTOR: Please fill out a blank similiar to the above for each case that you may meet with, and return them to this office by 12 M. of each day. Please give all the history known to you of each case under the head of Remarks.

Yours Very Respectfully,
T. S. SCALES, M. D., *Health Officer.*

NO. 57.

SIZE 5 IN. X 8 IN.

REPORT OF OUTBREAK OF A COMMUNICABLE DISEASE.

To be mailed to the Secretary of the State Board of Health, Concord, N. H., immediately on the occurrence of a first case of cholera, smallpox, typhus fever, yellow fever, diphtheria, membranous croup, scarlet fever, typhoid fever, and measles.

To the Secretary of the State Board of Health:

SIR:—There has come to my knowledge a case of.....
(Name of disease.)
.....in.....
(Town, city or village.)
The first person sick is.....
a.....,about.....old, who was taken sick with
(Male or female.) (Age.)
this disease on the.....day of.....,189 . The
(Month.)
number of cases which have already occurred is.....
The danger of the spreading of the disease is.....
(Great, not great, etc.)
for the reason that.....
.....
Precautionary measures.....
(Will be taken, have been taken, or are suggested to the
.....as follows,.....
State Board of Health, as the case may be.)
.....
.....
Signature.....
.....
(Whether Health Officer, or Secretary of Local Board of Health.)
.....189 .
(Postoffice Address.) (Date.)

Please fill the blank spaces in this notice if possible, but having learned the name of the disease, do not delay sending the report in order to learn other facts provided for in this blank.—Sec. State Board of Health.

NO. 58.

SIZE 5½ IN. x 8½ IN.

THE STATE OF NEW HAMPSHIRE.

WEEKLY REPORT DURING THE PREVALENCE OF A COMMUNICABLE DISEASE.*

To the Secretary of the State Board of Health, Concord, N. H.:

SIR:—The following is a report of all known cases of the diseases named below, in....., N. H., during and at the close of the week ending Saturday.....189 :
(Date.)

NAMES OF DISEASES.†	Number of sick at last Report.	DURING THE WEEK, NUMBER.			Number sick at close of week.	Number of infected houses.
		Taken sick	Recovered.	Died.		
DIPHTHERIA.....	.....	.....	.....	.....	.....	.....
MEMBRANOUS CROUP....	.....	.....	.....	.....	.....	.....
SCARLET FEVER.....	.....	.....	.....	.....	.....	.....
TYPHOID FEVER.....	.....	.....	.....	.....	.....	.....
MEASLES.....	.....	.....	.....	.....	.....	.....
†.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....

What action has your Board taken?.....
.....
.....
.....
.....
.....

.....
(Signature.)

.....
(Health officer or secretary Local Board of Health.

.....
(Post-office Address.)

.....
(Date of making this Report.)

* The Health officer or secretary of each local board of health in New Hampshire is respectfully requested to forward a report on this blank to the State Board of Health, Concord, N. H., promptly after the close of each week, during any portion of which a case of the diseases named in this report has been present within the jurisdiction of his board.

† Add to this list the names of such diseases as smallpox, cholera, yellow fever, typhus fever, etc., whenever it occurs.

If this is the last blank (Form 3) that you have, make a cross against this sentence and more will be sent you.

NO. 59.

SIZE 9 IN. X 15 IN.

SMALLPOX.

A CONTAGIOUS AND INFECTIOUS DISEASE.

All persons are forbidden to go into or out of these premises, or to carry into or out of them any material whereby Small-Pox may be conveyed except by permission of the Board of Health, under penalty of not less than five dollars ($5.00) nor more than twenty-five dollars ($25.00) for any violation of this order.

The Burgess or Health Officer will give to all who ask printed instructions how to prevent Small-Pox and all infectious diseases.

.....Clerk of Council.

.....Chairman Board of Health or Sanitary Com.

Date.....18....

BENJAMIN LEE, M. D., Secretary State Board of Health.

NO. 60.

SIZE 6½ IN. X 9 IN.

HEALTH DEPARTMENT, CITY OF NEW YORK.

DIPHTHERIA.

All persons not occupants of this apartment are advised of the presence of Diphtheria in it, and are warned not to enter.

The person having Diphtheria must not leave the apartment until the removal of this notice by the Health Department.

By order of the Board of Health.

CHARLES G. WILSON, *President.*

EMMONS CLARK, *Secretary.*

Inspector.

.....

Sanitary Inspector.

NO. 61.

SIZE 8½ IN. x 11 IN.

CITY OF SEATTLE — Department of Sanitation.

KEEP OUT.

Whereas, There is a person affected with an infectious disease in this house, it is hereby ordered that no person enter or leave this house without the written permission of the Health Officer of the City of Seattle.

Any person violating this order will be subject to prosecution, and liable upon conviction to a penalty of fine and imprisonment as provided by Ordinance No. 2406 as amended.

F. S. PALMER, M. D., *Health Officer.*

NO. 62.

USED IN NEWARK.

SIZE 3½ IN. x 5½ IN.

NOTICE.

This house contains a case of

SCARLET FEVER.

When the danger from contagion has passed, this card will be removed.

Per order,

BOARD OF HEALTH.

Any person removing, defacing or obscuring this card without authority, is liable to a fine of Fifty Dollars.

NO. 63.

POSTAL CARD.

HEALTH DEPARTMENT.

PROVIDENCE, ...

On account of contagious disease in the house, the following named, said to be employed by you, should not be permitted to return to work without a permit from the Medical Inspector: .....

.....

.....

EUGENE P. KING, *Medical Inspector.*

NO. 64.

SIZE 3 IN. X 5⅛ IN.,

BOARD OF HEALTH.

Ref. No.

PASS

To Quarantine Inspector, and others whom it may concern:

This is to Certify, That.....
has permission to leave and enter the premises No.....
.....now under quarantine for
.....

The isolation of the patient in a remote part of the house, and the non-intercourse of the person to whom this pass is granted with the patient, or those in attendance upon the same, is the basis upon which this privilege is granted.

Any violation of the above conditions will operate as a forfeiture of this Pass.

.....M. D.,
Health Officer.

DETROIT,.....189..

In case of any difficulty show this pass to the Quarantine Inspector.

NO. 65.

SIZE 3½ IN. X 5½ IN.

BUSINESS PERMIT.

HEALTH DEPARTMENT, CITY HALL,
Providence.

.....
residence.....
is hereby given permission to attend business.

.....
Medical Inspector.

NO. 66.

SIZE 3½ IN. X 5½ IN. (YELLOW PAPER.)

BUSINESS PERMIT.

HEALTH DEPARTMENT, CITY HALL,
Providence.

.....
residence.....
is hereby given permission to attend business while he lives away from home.

.....
Medical Inspector.

NO. 67.

SIZE 5½ IN. X 8 IN.

PRO

BOARD OF HEALTH.

DETROIT, MICH., 189

REFERENCE NO.

Permission is herewith given.....
to continue work, provided that remains perfectly isolated
from the patient
at.....
and has no contact with any one attendant upon the same, until the above house has been disinfected and placard removed by an officer of this department.

Per.....

Any violation of the terms of the above agreement, will result in a forfeiture of the privilege granted.

NO. 68.

SIZE 3½ IN. X 5½ IN. (YELLOW PAPER.)

SCHOOL PERMIT.

HEALTH DEPARTMENT, CITY HALL,
Providence.

.....

residence .....

is hereby given permission to attend school while he lives away from home.

.....

Medical Inspector.

NO. 69.

SIZE 4 IN. X 6½ IN.

OFFICE OF THE BOARD OF HEALTH.

Minneapolis, Minn., ... 189....

This is to Certify, That the children of _____

_____ living at No. _____ St. Ave. N. E.

are hereby permitted to return to school, all the rules and regulations of the said board pertaining to the public health in which the above family was interested, having been complied with.

_____ *Commissioner of Health.*

Per _____ *Clerk.*

NO. 70.

SIZE 3½ IN. X 5½ IN.

SCHOOL PERMIT.

HEALTH DEPARTMENT, CITY HALL,
Providence.

.....

residence .....

is hereby given permission to attend school.

.....

Medical Inspector.

NO. 71.

SIZE 5½ IN. X 8 IN.

OFFICE OF THE
HEALTH DEPARTMENT.
No. 19 City Hall.

Rochester, N. Y., ... 189

To the Principal of School No.

I do hereby Certify that the Children of

M.....

of No. .....Street, in whose family..... cases

of.....have recently existed, are in a safe condition to attend school, there being no further danger of contagion or infection. (*Signed*)

.....M. D.

Approved by the BOARD OF HEALTH.

.....

Health Officer.

NO. 72.

PENNSYLVANIA LAWS, CHAPTER 124 OF 1895.

SECTION 4. In the care and burial of the bodies of persons who have died of cholera, small-pox, yellow fever, typhus fever, scarlet fever, relapsing fever, diphtheria, diphtheritic croup, membranous croup, or leprosy, in any of the municipalities of this commonwealth, it shall be the duty of the undertaker or other person or persons having the body in charge, to thoroughly disinfect and place every such body within the coffin or casket in which it is to be buried within six hours after first being called upon to take charge of the same: *Provided*, Said call is made between the hours of five *ante meridiem* and eleven *post meridiem*; otherwise such body shall be placed in such coffin or casket within twelve hours, the coffin or casket then to be closed tightly, and not again opened, unless permission be granted by the health authorities for special and satisfactory cause shown: *Provided*, That the health authorities in any municipality may adopt more stringent rules and regulations than are herein provided for the disinfection, preparation, and burial of the bodies of persons who have died of any of the diseases named in this section, which rules and regulations they may from time to time alter or amend.

SECTION 5. The body of a person who has died of any of the diseases mentioned in section four of this act, shall not remain unburied for a longer period of time than thirty-six hours after death, unless special permission be granted by the health authorities extending the time during which said body may remain unburied for special and satisfactory cause shown. The head of the family and the person or persons having charge of the funeral of such body shall be responsible for any violation of the provisions of this section.

SECTION 6. All services held in connection with the funeral of the body of a person who has died of any of the diseases mentioned in section four of this act must be private, and the attendance thereat shall include only the immediate adult relatives of the deceased and the necessary number of adult pall-bearers, and any advertisement of such funeral shall state the cause of death. The head of the family and the person or persons having charge of said funeral services shall be responsible for any violation of the provisions of this section.

SECTION 7. The body of a person who has died of any of the diseases mentioned in section four of this act, shall in no instance be taken into any church, chapel, public hall or public building for the holding of funeral services. The head of the family, and the person or persons having charge of said funeral services, and the sexton, janitor, or other person or persons having charge or control of such church, chapel, public hall or public building, shall be responsible for any violation of the provisions of this section.

SECTION 8. No undertaker, or other person or persons having charge of the funeral or burial of the body of a person who has died of any of the diseases mentioned in section four of this act, shall in any case furnish or provide for such funeral more than the necessary number of conveyances for said adult relatives and pall-bearers, and all such conveyances which may have been used or occupied by any person or persons who have been residing in the same family or house with the deceased, shall be fumigated and disinfected at such time and in such manner as may be directed and required by the health authorities.

SECTION 9. The body of a person who has died of any of the diseases mentioned in section four of this act, shall not be conveyed to or from any dwelling, or other building or place, to any cemetery or other point except in a hearse or other vehicle used for the purpose of conveying corpses only, or in such vehicle as shall be satisfactory to the health authorities, and under such regulations as they may in any case adopt. The undertaker and the person or persons having charge of the funeral or transportation of such body, shall be responsible for any violation of the provisions of this section.

NO. 73.

RULE 1. The transportation of bodies dead of Small-pox, Asiatic Cholera, Yellow Fever, Typhus Fever or Bubonic Plague is absolutely forbidden.

RULE 2. The bodies of those who have died of Diphtheria (Membranous Croup), Scarlet Fever (Scarlatina, Scarlet Rash), Glanders, Anthrax or Leprosy, shall not be accepted for transportation unless prepared for shipment by being thoroughly disinfected by arterial and cavity injection with a proved disinfectant fluid (b) disinfecting and stopping of all orificies with absorbent cotton, and (c) washing the body with disinfectant, all of which must be done by an embalmer holding a certificate as such approved by the State Board of Health. After being disinfected as above, such body shall be enveloped in a layer of cotton not less than one inch thick, completely wrapped in a sheet and bandaged, and encased in an air-tight zinc, tin, copper, or lead lined coffin, or iron casket, all joints and seams hermetically soldered, and all enclosed in a strong, tight wooden box. Or, the body being prepared for shipment by disinfecting and wrapping as above, may be placed in a strong coffin or casket, and said coffin or casket encased in an air-tight zinc, copper. or tin case, all joints and seams hermetically soldered, and all enclosed in a strong outside wooden box.

RULE 3. The bodies of those dead from Typhoid Fever, Puerperal Fever, Erysipelas, Tuberculosis, Measles, or other dangerous communicable diseases, other than those specified in rules 1 and 2, may be received for transportation when prepared for shipment by filling cavities with an improved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a sheet and bandaged and encased in an air-tight coffin or casket, provided that this shall apply only to bodies that can reach their destination within forty-eight hours from time of death. In all other cases such bodies shall be prepared for transportation in conformity with rule 2. But when the body has been prepared for shipment by being thoroughly disinfected by an embalmer holding a certificate as in rule 2, issued by the State health authorities, the air-tight sealing may be dispensed with.

RULE 4. The bodies of those dead from diseases that are not contagious, infectious or communicable may be received for transportation when encased in a sound coffin or casket and enclosed in a strong outside wooden box, provided they reach their destination within thirty hours from time of death. If the body cannot reach its destination within thirty hours from time of death it must be prepared for shipment by filling the cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a bandage and encased in an air-tight coffin or casket. But when the body has been prepared for shipment by being thoroughly disinfected by an embalmer holding a certificate as in rule 2, issued by the State health authorities, the air-tight sealing may be dispensed with.

RULE 5. In case of contagious, infectious or communicable diseases the body must not be accompanied by persons or articles which have been exposed to the infection of the deceased, unless certified by the health officer as having been properly disinfected; and before selling passage tickets agents shall carefully examine the transit permit and note the name of the passenger in charge, and of any others proposing to accompany the body, and see that all necessary precautions have been taken to prevent the spread of the disease. The transit permit in such cases shall specifically state who is authorized by the health authorities to accompany the remains. In all cases where bodies are forwarded under rule 2 notice must be sent by telegraph to the health officer at destination, advising the date and train on which the body may be expected. This notice must be sent by

or in the name of the officer at the initial point, and to enable the health officer at destination to take all necessary precautions at that point.

RULE 6. Every dead body must be accompanied by a person in charge, who must be provided with a passage ticket and also present a full first-class ticket marked "corpse" for the transportation of the body, and a transit permit showing the physician's or coroner's certificate, name of deceased, date and hour of death, age, place of death, cause of death, and, if of a contagious, infectious or communicable nature, the point to which the body is to be shipped, and when death is caused by any of the diseases specified in rule No. 2, the name of those authorized by the health authorities to accompany the body. The transit permit must be made in duplicate, and the signatures of the physician or coroner, health officer and undertaker must be on the original and duplicate copies. The undertaker's certificate and paster of the original shall be detached from the transit permit and pasted on the coffin box. The physician's certificate and transit permit shall be handed to the passenger. The whole duplicate copy shall be sent to the official in charge of the baggage department of the initial line, and by him to the Secretary of the State, or Provincial Board of Health of the State or Province from which said shipment was made.

RULE 7. When the dead bodies are shipped by express the whole original transit permit shall be placed upon the outside of the box and the duplicate forwarded by the express agent to the express agent and secretary of the State or Provincial Board of Health of the State or Province from which said shipment was made.

RULE 8. Every disinterred body dead from any disease or cause shall be treated as infectious or dangerous to the public health, and must not be accepted for transportation unless said removal has been approved by the State or Provincial Health. Authorities having jurisdiction where such body is to be disinterred, and the consent of the health authorities of the locality to which the body is consigned has first been obtained; and all such disinterred remains must be enclosed in a hermetically sealed (soldered), zinc, tin or copper lined coffin or box.

NO. 74.

FOR THE

NOTIFICATION OF PERSONS HAVING CHARGE

OF

CONTAGIOUS DISEASE.

1. The patient must be kept in a room by himself.
2. All children in the house must be kept from school.
3. No visitors should be admitted.
4. Other members of the family must be kept away from the patient.
5. The one who nurses the patient must keep away from other people.
6. It is best to have some disinfectant always in the vessel in which discharges are received. In case of diphtheria or scarlet fever, all discharges from mouth and nose should be received in old cloths which can be burned. If received into a mug or dish, these should be thoroughly scalded.
7. In the room where patient is, the carpets should be taken up, all stuff, hangings, rugs, mats and chairs having stuff covers taken out, and the attendant should wear calico dresses.
8. Upon recovery of the patient, notice should be sent to the Office of the Health Board, City Building.
9. In case of death, the body should be immediately coffined, the coffin not again opened, the funeral must be within twenty-four hours after death. The funeral must be strictly "private," the body being carried in a hearse and not in a carriage. No wake can be allowed. All bed clothes, clothes of patient, and articles in the room, must remain in room until fumigated.

By order of the Board.

.....

Health Officer.

NO. 75.

HEALTH DEPARTMENT CIRCULAR
CONCERNING
SCARLET FEVER.

CONTAGION. Scarlet Fever is a contagious disease. It spreads from one person to another. The contagion is probably present from the first days of the disease until about five weeks from that time. Persons exposed to the disease do not always catch it, but we do not know any way of telling whether a person is susceptible or not. Therefore the patient should be *isolated;* that is, separated as much as possible from all well people.

ISOLATION. When a room is chosen for isolation, first, all useless articles should be removed, since everything in the room is liable to become infected with the disease. Then keep the patient in the one room until complete recovery. No one but the physician, nurse or mother should be allowed in the room. No articles should be taken from the room until they have been disinfected.

No visitors, especially children, should be allowed in the house.

Soiled linen, sheets, underwear, towels, and similar articles, should be at once placed in a tub or pail standing in the room and containing a disinfecting solution, and after standing awhile should be thoroughly boiled and washed apart from the rest of the washing. The Circular on Disinfection shows what to use as a disinfectant. It is best not to use handkerchiefs at all, but pieces of old, soft cloth which should be burned at once.

All dishes used by the patient should be put in a disinfecting solution in the room, and scalded and washed by themselves.

Do not let the child wear school clothes while sick, for they should not be worn to school until they have been disinfected. All school and library books must be given to the Superintendent of Health for disinfection.

When possible it is a good plan to send away from the house any children that may not have been exposed to the fever. Such children should of course be carefully watched for any symptoms of the disease, and if no such symtoms appear the children should remain away until after the removal of the placards. As soon as it seems certain that such children thus living away are not likely to have the disease, this Department will issue to them a permit to attend school, if desired.

The law requires that *under no circumstances shall the sick person leave the house without a permit* from the Superintendent of Health.

It is also against the law for other children in the family of the sick one to attend school, Sunday school, or to visit the public library or any other public place, or to ride in the cars, and they should not play in the street with other children.

About two or three weeks after the beginning of the sickness some of the patient's skin usually becomes like "dead skin," and rubs off or peels off. This peeling usually continues longest on the hands and feet. Sometimes it is so slight that it is not noticed. When five weeks have passed since the beginning of the disease, and when the patient is through "peeling," it is proper to disinfect the patient and the rooms in which he has been sick. After satisfactory disinfection the cards will be removed from the house, and school and work permits will be given when required.

Notify this Department when ready for disinfection.

Please read the Rules of the Board of Aldermen in regard to Contagious Diseases.

All these precautions must be taken in the mildest as well as in the most severe cases.

PROVIDENCE, February, 1899.

An excellent and much more extended circular was issued by the New Hampshire board of health in 1900.

NO. 76.

What You Ought to Know About DIPHTHERIA.

Diphtheria, one of the gravest of infectious diseases, is due to a bacillus which invades, by preference, the mouth, nose and throat. Of the many persons whose throats and noses harbor these little organisms only some develop diphtheria, and they are the ones whose mucous surface the bacillus is able to penetrate. Neither age nor robust health exempts any one from infection, but children, whose tissues are less resistant, suffer far more from diphtheria than do adults. *Any person*, therefore, who has been in intimate contact with a case of diphtheria *may carry the infection* about with him and *yet remain well.* In the presence of an epidemic of diphtheria every sore throat, however mild, every running at the nose, in child or adult, should be treated with the respect due to a formidable enemy. Every individual who has been in personal contact with a case of diphtheria should be regarded as infected until the contrary is proved.

But a man whose nose is infested with these malignant organisms, carries in his pocket *a thing more deadly.* His *handkerchief* contains the dried virus in a condition to be preserved indefinitely. It may go with his own or other people's *clothing* to the unsuspecting laundress, or it may remain for months in the pocket of an unused coat, to be fished out at last as virulent as ever.

Bearing in mind these observations in the outskirts of an epidemic, if one reflects upon the focus of germs in the bed chamber of diphtheria, the view will be as alarming as the truth will bear.

It remains to say much that is of better cheer. It is quite *possible to confine* the evil influence of a case of *diphtheria* to a radius of six feet or so, and to make a nurse within such narrow bounds reasonably secure against infection. The poison of diphtheria is not easily diffusible. The patient's breath, though often offensive, is not noxious. No particle of active virus can escape from his body except in the form of discharge from his mouth or nose, nor can any attendant become infected unless

Some Ponderable Portion of this Discharge is Conveyed into Nose, Mouth or Eyes.

Surely then the attendant commands all the avenues. Knowing this much she will easily avoid direct transfer of the infection from the patient to herself. To guard against indirect transfer *by means of handkerchief, towel, cup, spoon, or worst of all, fingers*, is not so easy. Only unrelaxed vigilance, and a devout observance of details will serve this end.

If then a case of diphtheria occurs in your house, do these things religiously. Strip the sunniest room, at the top of the house, of its carpets, curtains, upholstery, chairs, pictures, ornaments, trunks. Empty closets and drawers. As far as possible send out everything and bring in nothing which cannot be *baked, boiled or burned.* If you have a cheap cot which can be made comfortable with a quilt or two, you have the best possible bed. In addition to the necessary queensware, you want a pail or two to hold antiseptic solutions. You must have a little pile of towels for your own exclusive use, and a large assortment of cloths, mostly small ones, to serve the patient in place of towels, napkins and handkerchiefs. Now bring your patient in and from this moment you must not permit either yourself or anything in the room to pass the door without first going through the *most rigid antisepticuritual* that you can conveniently practice. The little *cloths* which the patient uses must do but one single service, and then either be *burned* or dropped into a pail of bichloride solution.

Every *spoon, cup, thermometer* or other article must, after use, be immediately *immersed in an antiseptic solution*, and left there until needed again, when it must be rinsed in clear water.

The *expectorated* or *vomited* matters and the discharges from the bowels and bladder must be treated with antiseptic solution at once, and before being carried from the room the utensil should be wrapped in a cloth wet with *bichloride solution.*

Your own hands and those of your patient are to be objects of momentary solicitude. Keep a bowl of bichloride solution always ready, and wash your hands every time you touch your patient or his bed. *Never touch* your own face, nor that of your patient, nor move a chair, nor fetch a utensil, nor turn the door knob,

Except with Hands Fresh from the Bichloride Solution.

Prevent, if possible, your patient from touching his own face, and if he does so, clean his hands instantly with a bichloride cloth. You will certainly not permit the patient to touch your face. When you must leave the room do not touch any person or thing that can be passed without contact.

When the doctor comes, take away from the bed the chair which you have used, and place for him the only other one, which you have not used, and must not use. Give him a bichloride towel if he wants one, and hold a bowl of bichloride solution for him to drop instruments into. Let him have bichloride for his hands, a nail brush and a fresh towel. When he is ready to leave, open the door for him, and *let him go away as clean as he came.*

In your own person and dress be as clean as circumstances will permit. However careful you habitually are,

Double Your Customary Care of Teeth, Throat, Mouth and Nose.

If after two weeks another case of diphtheria appears in your household, it may be impossible to say who or what furnished the infection, but if you have faithfully followed these rules yon will have the *comfortable belief* that none of the poison which you carried into the room ever leaked out. On the other hand if you slurred the details, and took avoidable chances, you will not be able to meet a fresh case without some *guilty fear* that you have let the enemy through.

JOHN S. FULTON,
Secretary of the State Board of Health of Maryland.

Tablets of Bichloride of Mercury can be bought at any drug store in bottles of 100 with printed directions for making solutions.

NO. 77.

MEASLES.

BOARD OF HEALTH,
32 PEMBERTON SQUARE,
BOSTON, June 1, 1883.

The Board of Health issues the following circular of recommendations, with the hope that those who are not familiar with the proper means to be used in cases of Measles to prevent the spread of the disease, may be benefited thereby.

This disease is like Small-pox and Scarlet Fever in its power to spread from person to person by contagion or infection.

It may be contracted directly from the person who is ill with the disease, or it may be taken from the room, clothing or anything that has been used by or about the sick person, and which has not been thoroughly disinfected.

It attacks persons of all ages and at all seasons of the year.

It manifests itself in about a week after exposure to the disease, and, as a rule, occurs but once in the same person.

When a case of Measles occurs, put the patient in a room apart from the other inmates of the house and allow no person to enter such room, except the nurse and

[illegible] exposed to the sunlight, well [illegible] other articles which cannot be [illegible]

[illegible] should be at once placed in [illegible] pounds of sulphate of zinc and [illegible] water. Water-closets and privies in [illegible] copperas.—two pounds [illegible] the house should be removed [illegible]

[illegible] mingle with other children, [illegible] infected articles have been disinfected. [illegible] thorough disinfection should [illegible] once subjected to the fumes of [illegible] and burn two pounds of sul- [illegible]

[illegible] free currents of air.

[illegible] may be so treated. The walls and [illegible] and the floors washed with some [illegible] should be immediately placed in [illegible] and finally closed.

[illegible] the house where the patient died. [illegible] the most thorough disinfection has [illegible]

[illegible] remove all infection from themselves [illegible]

[illegible] be done by the Board of Health, if [illegible]

[illegible] Board of Health.

SAMUEL H. DURGIN, M. D.,
Chairman.

No. 78.

[illegible] PREVENTION

[illegible]

[illegible]

[illegible] STATE BOARD OF HEALTH.

[illegible]

[illegible] *Disease*, hence it is a "disease [illegible] laws in Michigan, and the observance of [illegible]

2. Inasmuch as [illegible] of the most contagious diseases and when [illegible] course of from two to three months, an average of ten weeks, and is spread by those sick with it before the "whoop" appears, therefore, in order that its restriction shall be most complete, it is important that the early symptoms be generally known. The first or catarrhal stage resembles an ordinary cold. The symptoms are a cough, usually rather severe with a tendency to become paroxysmal, sneezing, sometimes watering of the eyes, and often a slight fever. Restlessness, with a loss of appetite, and increased thirst, usually accompany these symptoms. It is often necessary to wait for the second

stage, which is characterized by the "whoop" before the disease can be distinguished. When a child or young person has symptoms of whooping-cough, or a cold or cough unusually severe with a tendency to become paroxysmal, it should immediately be kept separated from all other persons, except necessary attendants until it is ascertained whether or not it has whooping-cough, or some other communicable disease.

3. *Period of Incubation.*— The interval between the date of infection and that of the outbreak of symptoms of whooping-cough usually varies between four and twenty-one days.

4. *Every person* known to be *sick with whooping-cough* should be *promptly* and *thoroughly isolated* from the public; no more persons than are actually necessary should have charge of or visit the patient, and they should be restricted in their intercourse with other persons.

5. *Plain and distinct notices should be placed upon the premises or house in which there is a person sick with whooping-cough.*

6. *Householders and Physicians* must immediately give notice of the first case and of every case of whooping-cough to the local health officer. This is required by law.

DUTIES OF THE LOCAL BOARD OF HEALTH.

7. Upon the receipt of notice of the occurrence of whooping-cough, the health officers and the Board of Health have duties to perform in taking measures to restrict the spread of the disease, which it is a violation of public trust for such officers to neglect or postpone. That no time may be lost, it is the duty of every board of health to make provisions for prompt action by its health officer, authorizing and directing him to be prepared at all times, as executive officer of the board, to take action without waiting for a meeting of the board, whenever a case of diphtheria, scarlet fever, measles, whooping-cough, small-pox, *or other disease dangerous to the public health* occurs within its jurisdiction. The duties of the local board of health relative to the restriction and prevention of diseases are treated of in a circular No. [120] issued by the State Board of Health.

DUTIES OF THE HEALTH OFFICER.

Some of the duties of the health officer generally required by law, may be briefly suggested as follows: Whenever he has reason to believe that there is in his jurisdiction a case of whooping-cough, he should,—

a. Promptly investigate the subject.

b. Order the prompt and thorough isolation of those sick or infected with whooping-cough.

c. See that no person suffers for lack of nurses or supplies.

d. Give public notice of infected places by placard on the premises, and otherwise if necessary.

e. Notify teachers or superintendents of schools concerning families in which there are cases of whooping-cough.

f. Supervise funerals of persons dead from whooping-cough.

g. Disinfect rooms, clothing and premises, and all articles likely to be infected, before allowing them to be used by other persons than those in isolation.

h. Keep the president of this board of health and the secretary of the State Board of Health constantly informed respecting every outbreak of whooping-cough.

In the absence of regulations made by the local board of health, conflicting therewith, orders by the health officer in the lawful performance of these duties have the force of regulations by the board of health.

Unless otherwise ordered by the local board of health, these duties are required of the health officer by Act 137, laws of 1883. Section 2 of this act, as amended by Act No. 34, approved March 28, 1889, provides that—

"Whoever shall knowingly violate the provisions of section one of this act, or the orders of the health officer made in accordance therewith, shall be deemed guilty of a misdemeanor, and upon conviction thereof he shall be punished by a fine not exceeding one hundred dollars, and the costs of prosecution, or in default of payment thereof, by imprisonment not exceeding ninety days in the county jail in the discretion of the court."

This penalty seems to apply to the health officer, or to whoever violates his orders. The health officer should also, in due time, give certificates of recovery and of freedom from liability to give whooping-cough, but not until after thorough disinfection following complete recovery.

THE RESTRICTION OF WHOOPING-COUGH.

8. The room in which one sick with whooping-cough is to be placed should *previously* be cleared of all needless clothing, carpets, drapery, and other materials likely to harbor the poison of the disease. This room should constantly receive a liberal supply of fresh air, without currents or drafts directly upon the patient.

9. The discharges from the throat, nose, and mouth are liable to communicate the disease, and should be received in vessels containing a strong disinfectant, or on soft rags or pieces of cloth which should immediately be burned.

10. Nurses' and attendants' hands should be washed and disinfected by chlorinated soda, their hair, (and beard if any), should receive attention, and their clothing should be disinfected, before they go in public.

11. Every person recovering from whooping-cough should be considered dangerous. The duration of infectiousness may be three weeks before the "whoop" and four or six weeks after apparent recovery: therefore such a person should not be permitted to associate with others, or to attend school, church, or any public assembly until in the judgment of a careful and intelligent health officer he can do so without endangering others; nor until after all his clothing has been thoroughly disinfected. Nor should a person from premises in which there is or has been a case of whooping-cough, attend any school, Sunday-school, church, or public assembly, or be permitted by the health authorities or by the school board to do so, until after disinfection of such premises and of the clothing worn by such person, if it shall have been exposed to the contagion of the disease.

12. No public funeral should be held at a house in which there is a case of whooping-cough, nor in which a death from whooping-cough has recently occurred. No child should attend, and it would be better in most cases that few adults attend a funeral of a person dead of whooping-cough.

. . . . . .

HOW TO AVOID AND PREVENT WHOOPING-COUGH.

13. Avoid the special contagium of the disease. Do not let a child go near a case of whooping-cough. This is especially important to be observed by guardians of children between one and two years of age. Do not permit any person or thing, or a dog, cat, or other animal to come direct from a case of whooping-cough to a child. Unless your services are needed, keep away from the disease yourself. If you do visit a case, bathe yourself, and change and disinfect your clothing before you go where there is a child.

16. Do not permit a child to ride in a back or other closed carriage in which has been a person sick with whooping-cough, except the carriage has since been thoroughly disinfected with fumes of burning sulphur, as specified in paragraph 15.

17. Do not permit a child to wear or handle clothing worn by a person during sickness or convalescence from whooping-cough.

18. Beware! Any person who has a cough with a tendency to become paroxysmal: do not permit a child to kiss, or take the breath of such a person, nor to drink from the same cup, blow the same whistle, or put his pencil or pen in its mouth.

. . . . . .

IMPORTANCE OF RESTRICTING WHOOPING-COUGH.

In Glasgow the annual mortality from whooping-cough for forty years, 1855-94, was nearly fourteen (13.5) per ten thousand inhabitants, and exceeded those from any other dangerous communicable disease.

In all England and Wales in 1891, the deaths from whooping-cough (13,612), were nearly five (4.68) per ten thousand inhabitants, and exceeded those from measles (12,673), diphtheria (5,036), scarlet fever (4,959) or typhoid fever (4,875).

In Michigan, the *reported* deaths from whooping-cough are several times as many as from small-pox; for the twenty-four years, 1870-1893, they averaged 145 per year. If we assume that only three-fourths of the deaths were reported, the deaths in Michigan from whooping-cough have been about 193 per year. If the inhabitants of Michigan now number two and a quarter millions, and the mortality from whooping-cough were to equal that in England and Wales in 1891, the deaths from that disease in Michigan would equal a little over one thousand per year.

It is claimed that the high mortality in whooping-cough is due to the complications and sequelæ which are said to occur probably in one-third or one-fourth of all cases. If that is true, it would be no extravagance to presume that the mortality from whooping-cough would be still higher if all the deaths directly or indirectly due to it were completely reported, as it is a fact that when a secondary affection attacks, the primary disease is sometimes lost sight of entirely.

According to Dr. Farr's law—of increase of contagious diseases as density of population increases—the death rate from whooping-cough, unless restrictive measures are taken, will undoubtedly rapidly increase in Michigan with the rapidly increasing population, and especially with the rapidly increasing lines of railroads and other facilities for easy, frequent, and rapid movements of the people. The present very considerable mortality from whooping-cough, and also the much greater mortality which may be expected, supply urgent reasons why the measures herein recommended should be generally and thoroughly adopted and enforced.

This document is published by the State Board of Health, for gratuitous distribution throughout the State. A copy may be obtained by applying to the SECRETARY OF THE STATE BOARD OF HEALTH, LANSING, MICHIGAN.

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NO. 79.

TYPHOID FEVER.

HEALTH DEPARTMENT,
Old Court House,
Boston.

This circular is issued for the purpose of inducing greater care in preventing the spread of typhoid fever, which may be contracted by infection, directly from the patient, or indirectly from anything which has been infected by the patient.

The discharges from the bowels and bladder of the typhoid patient are the principal if not the only sources of danger and they may infect the sick chamber, drain, cesspool, vault, or by percolation, may infect the well, cistern or other source of drinking water, and so foods, especially milk, fruit, greens, etc., and produce the disease in other persons.

When a case of typhoid fever occurs in any family, the sick person should be placed in a room apart from the other inmates of the house and should be nursed as far as possible by one person only. The sick chamber should be well ventilated, warmed and exposed to sunlight; its furniture should be such as will permit cleansing without injury, and all extra articles should be removed from the room. All doubtful cases should be referred for diagnosis to the laboratory of the Health Department.

No person who is in any way connected with a case of typhoid fever as nurse or attendant, or who handles anything which may have been soiled by the discharges of a person while suffering from typhoid fever, should touch any kind of food or water or receptacles for such food or water, which may be used by other people.

Keep on hand a solution of the best fresh chloride of lime (one-half pound to a gallon of water) in a jug well corked, and put one-half pint or more of this solution into the vessel immediately before it is used to receive the discharges of the patient. The discharges should always be well mixed and covered with the disinfecting solution, and remain for thirty minutes before being removed.

The same disinfectant should be freely used in all wash-bowls, sinks, water-closets and slop-hoppers. Vaults and cesspools, if used, should receive large quantities of dry chloride of lime.

All clothing, bed-linen, etc., which comes in contact with the patients should be put into a disinfecting solution of corrosive sublimate (one drachm of corrosive sublimate and eight drachms of common salt to each gallon of water (1 in 1000), in a wooden vessel marked poison) and then boiled for one-half hour.

This disinfecting solution may be used on all hard surfaces not metallic. For metallic surfaces use 5 per cent. formalin. Every kind and source of filth in and around the house should be removed, disinfectants freely used and drains put in good condition.

On the termination of the disease, the room, bedding and clothing should be thoroughly disinfected, as recommended in this circular.

Typhoid patients may be a source of danger to the community until their urine is free from typhoid bacilli. This dangerous condition of the urine may last several weeks after recovery, and during this time the urine should be disinfected. The presence of the bacilli in the urine and their disappearance later will be tested, on request, at the laboratory of the Health Department.

By order of the Board of Health,

SAMUEL H. DURGIN, M. D.,
Chairman.

Revised October, 1888.

NO. 80.

SIZE 5¼ IN. X 9 IN.

O

☞ *Have This Card in the Sick Room.*

IN CASES OF

INFECTIOUS OR CONTAGIOUS DISEASES.

Don't allow carpets or draperies in the sick room.

Don't send the bed or body linen to the wash without disinfection.

Don't use dishes again which have been in the sick room without boiling them 15 minutes in Sal-Soda water.

Don't throw the discharges of the sick into the water closet or privy.

Don't bury them until they have been thoroughly disinfected.

Don't leave the room of sick without first washing your hands in a good disinfecting solution of Sal-Soda or Nitrate of Soda or Chlorinated Soda.

For further information see Circulars on Disease Circulars.

A publication of this character is right in line with the very necessary, as such publications have been issued for the benefit of the public. Circulars urging vaccination are most useful. Many boards of health have been issued by the state boards of New York, Alabama, New Jersey, Connecticut

NO. 81.

FULL QUARANTINE NOTICE.

FOR USE IN CASES OF SMALLPOX, TYPHUS FEVER, CHOLERA, DIPHTHERIA, AND SCARLET FEVER.

To .....

.....having been reported to me as being in your family, you will see that all persons and things now on the premises or in the house occupied by you are at once isolated from all other persons and things; you will allow no communication between any person now on the premises or in the house occupied by you, and any other person whatever, except that articles of food and drink and such fuel and clothing as are necessary for the comfort and health of those persons under quarantine, papers and letters, may be received, and such pails, cans, bottles or boxes of metal as are necessary for the conveyance of the above may be given out, all in the manner and under the conditions prescribed by the Health Officer.

And further exception is hereby made, so that all drugs, food and other articles necessary to the proper treatment of the sick may be received by you, and the attending physician may enter and leave your premises at pleasure, provided such measures are used as to prevent carrying the infection outside.

No other person whatever shall enter or leave your premises during the existence of this quarantine, except as permitted, in writing, by the Health Officer.

You will carefully observe the above quarantine, under penalty of the law, as prescribed in No. 103, Laws of 1896, until such time as the quarantine shall be terminated by a written notice signed by the Health Officer.

.....

Health Officer for

Town (or City) of.....

MODIFIED QUARANTINE NOTICE.

FOR USE IN CASES OF MEASLES AND WHOOPING-COUGH.

To .....

.....having been reported as being in your family, you will see that no person now in your family, who has not had this disease, is allowed to leave the house or premises occupied by you, and that no person who has not had this disease is allowed to enter your house or premises until further notice, under penalty of the law, as prescribed in No. 103, Laws of 1896.

.....

Health Officer for

Town (or City) of.....

....., 189.....

NO. 82.

SIZE 5¼ IN. X 8 IN.

OFFICE OF THE BOARD OF HEALTH.

READING, PA.....1895.

.....

Information has been received at this office that a contagious disease (.....) exists in your house, No.....Street.

You are hereby notified not to allow any child or inmate of your house to attend any school until the attending physician has given a certificate to the Health Office that all danger from contagion by reason of such disease has passed away.

[illegible]

[illegible] Driven. Public supply.

[illegible] premises or adjacent.....

[illegible] trapped? Yes. No.....

[illegible] a year.....

[illegible] .....Teacher.

[illegible]

Officer.....

NO. 84.

SIZE 8½ IN. x 14 IN.

HEALTH DEPARTMENT.

CITY OF ROCHESTER.

Inspector..... Date.....189

Street No.....Size of Lot.....Per cent. covered.....

Buildings.....

Owner.....Address.....

House — { Private / Boarding / Apartment / Tenement. } No. of Stories.....

	1	2	3	4	
Rooms,					
Occupants,					

Condition .....

Ventilation.....	1	2	3	4
Rooms without windows,				
Halls " "				

Light-shaft, sky-light, or ventilating shafts, transoms:.....

Heating.....Has furnace an air box ?.....

Where does it open.....Condition.....

Cellar..... Depth.....

How floored.....No., size and condition of windows.....

Drainage.....

Plumbing — Is house connected with sewer or cess-pool.....

Is sewer in street.....Is Hemlock water used.....

Number of fixtures.....Fixtures without traps.....

Main waste pipe : Iron, lead.. Joints.....

Water Closets — Number..... Kind.....

Sufficient water flushing..... Condition .....

Is the room ventilated.....

House drain { iron / tiling / wood } underground or exposed.....

Joints, etc.....

Main or running trap.....Fresh air inlet.....

Yard.....

Garbage, how kept ?.....

Ashes, how kept ?.....

When removed ?.....

Privy — Construction.....

Is it ventilated.....Is it full.....

When was it last cleaned.....

Situated.....ft. from house.....ft. from nearest adjoining house .....ft. from N. line of lot.....ft. from S. line.....ft. from E. line .....ft. from W. line.

Disease.....Age.....Sex.....School and Grade.....
School and Grade attended by other children.....
Occupation and Place.....Milk.....Ice.....
Occupation and place of employment of every member of the family.....
.....
.....
Have there been any cases of contagious diseases where the patient lives or where he has lived?.....
Are the members of the family subject to sore throat or catarrh?.....
Has any one with sore throat recently visited the patient?.....
What, if any, means are provided for isolating the patient?.....
How are the discharges from the mouth and nose received?.....
Well?.....Disinfection and Disposition of Stools?.....
Probable Source of Disease?.....
Health Officer's Notice to Abate Nuisance.....
Nuisance Abated.....
Referred to Medical Officer.....
Citation.....
Order.....
Referred to.....

NO. 85.

POSTAL CARD.

HEALTH DEPARTMENT.

DISTRICT OF COLUMBIA.

.....189

A case of.....

having been reported at

No.....

street the following children and others, if any, from said premises, should be excluded from school until they present certificates from this office stating that they may safely return thereto.

WM. C. WOODWARD, M. D.,
Health Officer.

.....

.....

.....

NO. 86.

REPLY POSTAL CARD.

CHICAGO,.....189..

THE PRINCIPAL

.....SCHOOL:

THE HEALTH DEPARTMENT has just learned of the existence of a case of *Diphtheria*, *Measles*, *Scarlet Fever*, *Whooping Cough.* in the family of.....
living at.....
in the vicinity of your school.

For the protection of your pupils you are hereby authorized to exclude from school attendance, and from the buildings and grounds under your charge, all persons of said family, *especially school children*, if there be any such in the family.

This exclusion must be maintained until you are notified by the DEPARTMENT that the disease has terminated and that the premises have been disinfected.

You are also requested to warn the pupils of your School against any communication or contact with the members of the afflicted family during the period of exclusion.

Respectfully,.....M. D.,
Medical Inspector.

.....School,

CHICAGO,.....189..

Received from Dr.....notification

of a case of

Diphtheria, *Scarlet Fever*, *Measles*, *Whooping Cough*,

at No.....in

family named.....

.....
Principal.

NO. 87.

SIZE 3 IN. x 5 IN.

FEB. Diph.

No. ..... St. or Ave. ..... Ward .....
Date ..... 189 .... Name .....
Age ..... M. F. .... M. S. .... No. Case .... Date first Case .... Kind of House ....
No. Fams. ..... No. Adults .... No. Children ..... No. Sch. Children .....
Reported by ..... M. D. .....
Isolation — Home ... Hospital ..... Result .....
Bac. Exam. ..... True ..... Pseudo ..... Final Bac. Exam. No. ..... 189 ..
Disinfected ..... 189 ..... Milk Supply .....
Treatment — Anti-Tox. .... City .. Other .... Not used .... Water supply .....
Remarks ..... ○ Quarantine raised .....
Undertaker ..... Date of Funeral .....

Made by Library Bureau, Chicago.

NO. 88.

SIZE 5½ IN. x 10 IN.

Residence. **DIPHTHERIA.**

	Parish.	Occupation.	Members of Family.	Previous Attack.	Age.	Date of Attack.	Antitoxin.	Results of Cultures.
Binding Edge.								

(REVERSE.)

Residence

Physician

Inspector

Visits

Water, Pr[illegible]

Iceman

Milkman

Grocer

Marketman

Laundry

Paper Sox

Binding Edge.

Disinfection

Permits

NO. 89.

SIZE 4 IN. x 5 IN.

CITY OF CLEVELAND,
DEP'T OF POLICE, PUBLIC HEALTH DIVISION, ...189..
No. 102 CITY HALL.

Mr.....
No.....St.

You are hereby notified to have the Physician in charge of persons sick with Contagious disease sign this notice, when they have fully recovered, otherwise the children cannot attend school at.....School.

By order of the Public Health Division.

.....
Health Officer.

By.....
Sanitary Patrolman.

I HEREBY CERTIFY, That.....
of.....Street, has fully recovered from.....
....., ...Physician.
Address.....
Date convalescence commenced.....189..

Bring this ticket to 102 City Hall, as the children will not be allowed to return to school, and contagion disease card will not be taken down from your home by this Division until.....days after convalescence and disinfection of the premises.

NO. 90.

REPLY POSTAL CARD.

DEPARTMENT OF HEALTH:—CITY OF CHICAGO.

DOCTOR:—

Your report of Contagious Disease, at address named on accompanying Reply Postal Card, is received.

As the Principal of the School attended by the patient or children of the family will not admit to School any one from the house until permission is given by this DEPARTMENT, you will kindly mail the Reply Postal Card when all danger is passed.

The placard—if any—will then be removed from the house, and the premises disinfected by the DEPARTMENT, *if you so request.*

If, however, you assume responsibility for the disinfection, at the termination of the case, the word *not* should be written in last line of Reply Postal Card.

ARTHUR R. REYNOLDS, M. D.
Commissioner of Health.

N. B.—Formaldehyd has supplanted sulphur in all DEPARTMENT disinfection.

TO BE SIGNED BY THE ATTENDING PHYSICIAN, DATED AND RETURNED ON TERMINATION OF THE CASE.

CHICAGO,.....1809.

The case of Contagious Disease in the family of
.....
living at.....
has terminated.

Members of the family—including school children, if any—should be relieved from any further restriction.

Disinfection by the DEPARTMENT is *.....requested.

.....M. D.

* If the Attending Physician assumes responsibility of disinfection the word *not* should be written in this space.

[illegible] the nives-
[illegible] the tube of
[illegible] The former can
[illegible] number of
[illegible] The [illegible] of the
[illegible] the [illegible] of
[illegible] information of the
[illegible] routine, partly to
[illegible] and partly for use
[illegible]

NO. 92.

PRACTICAL FACTS ABOUT CHOLERA.

ISSUED BY THE STATE BOARD OF HEALTH OF MAINE.

(REVISED EDITION.)

Cholera, as it appears in America, is an exotic disease: that is, it never arises spontaneously on our soil. When it has appeared here, it has always been possible to trace it back to European ports and towns where cholera prevailed, and from there to India, where it always has its origin. Whenever it has left its Asiatic home and overrun Europe, it has invariably, sooner or later, found its way to our own country. In view of the possibility of having to deal with Asiatic cholera in our own Commonwealth, the State Board of Health thinks it prudent to issue this circular.

NATURE OF THE MALADY.

It is a specific disease caused by a specific organic poison, or disease germ, derived directly or indirectly from pre-existing cases of the same disease.

SYMPTOMS.

Cholera almost always begins with a premonitory diarrhœa. Later come vomiting, cramps, exhaustion, and collapse. In some cases the advent of the disease is sudden and its course and termination rapid; in other cases the disease advances no farther than the stage of simple diarrhœa, cases that are fraught with grave danger to the public, as their true character is often overlooked.

HOW IT IS SPREAD.

Cholera is an infectious disease, but it is infectious only in certain ways. It is not "catching," as smallpox and scarlet fever are understood to be. In Calcutta, where cholera is always present, hundreds of cases have been treated in the general hospital, and often in the same rooms with patients sick with other diseases, without ever being a source of infection to them. Physicians and nurses who care for the sick are little, if any, more liable to take the disease than others. And yet, on the other hand, a single case may poison many other individuals, and give rise to a wide-spread and very fatal explosion of the disease. How can we account for this paradoxical behavior of cholera? In this way: The cholera poison exists principally in the discharges from the bowels and in the vomited matter. If this poison is completely destroyed as soon as it leaves the alimentary canal, there is no danger of the patient's being a source of infection to other persons. But if the dejections are thrown, for instance, into the privy vault, the cholera germs find all the favoring conditions for their development and increase. From the privy vault, or from the surface of the ground, the poison may percolate through the soil, many feet it may be, and gain access to our wells or other water supply.

Let it be distinctly borne in mind that, to take the cholera, you must eat it or drink it. This is not an æsthetic statement of a general recognized fact, but it is hoped to make it emphatic.

Further facts in relation to the extension of cholera, are these: Privy vaults, cess-pools, sink drains, heaps of manure, filth-sodden earth, and other unclean places, once contaminated with the cholera-germ, may serve as culture grounds for them and for their multiplication, and may remain sources of danger for some time,

giving off their infection which, by being breathed in, may be mixed with the saliva and be swallowed. The infection of articles capable of carrying or holding that has been soiled by the choleraic person and without disinfection remains damp. Hands soiled hereby, if not with the infection may, as a rule, infect articles of food and thus spread the disease.

Articles of clothing in or from infected regions, especially if soiled with the choleraic excreta, may carry the disease long distances. During the epidemic of 1871, clothing packed by an Hamburg Swedish and Russian made the ocean voyage and the railway journey with no harm to persons on the way, but started cholera epidemics in the far West where the articles were opened.

Be reassured by the fact that cholera comes not from a pestiferous epidemic constitution of the atmosphere, but that it comes, as explained above, in accordance with certain laws which are now well understood. Remembering this, all unnecessary alarm may be avoided — only that salutary fear is desirable which shall lead each individual to avoid and remove those conditions which favor the only cholera but typhoid fever and other diseases.

How Prevented.

When the importation of cholera is threatened, a grave responsibility rests upon State and local authorities. Especially in ports engaged in foreign commerce, vigilance should be constant and active precautions when required. If cholera should be at work to effect a landing, the soil and the water may be contaminated and the person going out of the disease made impossible.

Special Rules.

1. *Examine* into the condition of private wells, cisterns, privies, cesspools, and all places where filth may collect or decay. The rule is therefore imperative to secure pure and abundant supplies of water for all purposes. Remove all decomposing animal and vegetable substances. Empty all privy vaults, cesspools, etc., with Solution A. Add to each privy vault as much as possible of the following better methods of disposal of excreta. Treat all cesspools in the same way. Ventilate rooms and keep the cellar dry and well ventilated. Of the greatest importance is an assurance that the water supply is not polluted — by privy vaults through the soil in case of wells, by human excreta from sewers or otherwise in the case of public water supplies.

2. Never neglect the personal disinfection. During this last stage the disease is usually curable.

3. If possible, burn all discharges coming from the patient, as well as all soiled articles of clothing and bedding that are not to be used.

4. If the discharges cannot be burned, do not treat any considerable quantity of them upon the ground or into the privy vault. Take them passed into a vessel containing several times their bulk of Solution A, or Solution B, and then poured into a deep hole in the ground remote from all buildings or water supply.

5. All soiled articles from the patient should be at once placed in receptacles, should be as soon as possible, either put to soak in a pail with Solution A, Solution B, or Solution C, carefully covered to exclude flies, and boiled immediately.

6. Upon the death of a person infected the body should be immediately inclosed in a sheet wet with Solution A, Solution B, or Solution C, or in a sheet dipped in the ordinary sheet, and buried as quickly as possible.

After death or removal, the room should be thoroughly disinfected by burning sulphur, as directed in Solution D, and by free ventilation. Doors and windows and all [illegible] should be sought. Such as mattresses and other bedding or furniture that has been soiled with the discharges of the patient and that cannot be disinfected with boiling water or with steam. Wash floors and walls thoroughly with Solution C or Solution D, and the bedstead if [illegible]

NO. 93.

INFORMATION FOR CONSUMPTIVES AND THOSE LIVING WITH THEM.

HEALTH DEPARTMENT.

No. 301 Mott Street.

NEW YORK, February 13th, 1894.

Consumption is a disease which can be taken from others and is not simply caused by colds. A cold may make it easier to take the disease. It is usually caused by germs which enter the body with the air breathed. The matter which consumptives cough or spit up contains these germs in great numbers — frequently millions are discharged in a single day. This matter, spit upon the floor, wall or elsewhere, is apt to dry, become pulverized and float in the air as dust. The dust contains the germs, and thus they enter the body with the air breathed. The breath of a consumptive does not contain the germs and will not produce the disease. A well person catches the disease from a consumptive only by in some way taking in the matter coughed up by the consumptive.

Consumption can often be cured if its nature is recognized early and proper means are taken for its treatment. *In a majority of cases it is not a fatal disease.*

It is not dangerous for other persons to live with a consumptive, if the matter coughed up by the consumptive is at once destroyed. This matter should not be spit upon the floor, carpet, stove, wall, or street, or anywhere except into a cup kept for that purpose. The cup should contair water, so that the matter may not dry, and should be emptied into the closet at least twice a day and carefully washed with hot water. Great care should be taken by a consumptive that his hands, face and clothing do not become soiled with the matter coughed up. If they do become soiled they should be at once washed with hot soap and water. When consumptives are away from home, the matter coughed up may be received on cloths, which should be at once burned on returning home. If handkerchiefs are used (worthless cloths which can be burned are far better) they should be boiled in water by themselves before being washed.

It is better for a consumptive to sleep alone, and his bed-clothing and personal clothing should be boiled and washed separately from the clothing belonging to other people.

Whenever a person is thought to be suffering from consumption, the name and address should be sent at once to the Health Department, on a postal card, with a statement of this fact. A medical inspector from the Health Department will then call and examine the person to see if he has consumption, providing he has no physician, and if necessary, will give proper directions to prevent others from catching the disease.

Frequently a person suffering from consumption may not only do his usual work without giving the disease to others, but may also get well, if the matter coughed up is properly destroyed.

Rooms that have been occupied by consumptives should be thoroughly cleaned, scrubbed, whitewashed, painted or papered before they are again occupied. Carpets, rugs, bedding, etc., from rooms which have been occupied by consumptives, should be disinfected. The Health Department should be notified, when they will be sent for, disinfected and returned to the owner free of charge, or, if he so desires they will be destroyed.

By order of the Board of Health,

CHARLES G. WILSON, *President.*

EMMONS CLARK, *Secretary.*

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[illegible] pulmonary consumption and
[illegible] little part in the causation of
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[illegible] the best authorities, the world
[illegible] transmission of tuberculosis are very rare.

PREVENTION.

☞ *Rules for the patient.*

Two facts should encourage the patient: One is that there is always an intrinsic tendency to recovery in the earlier stages of the disease, and that, under modern treatment, a large percentage of cases do recover; the other is that there is no reason for any person to think that he is doomed by heredity, no matter what his family history may be.

It should be impressed upon consumptive patients and other persons living with them that the sputum (what they cough up) is dangerous and must be properly disposed of. It must not become dry. There are several ways in which the sputum may safely be cared for:

A. Pressed paper spit-cups, costing but little, are on the market. One or several can be used daily and, after it has been used, each cup with cover and contents can be burned.

B. Paper cups held in a metal frame may be used. After use the cup and contents are burned.

C. Metal or porcelain spit-cups or spittoons, each containing a small quantity of disinfecting solution 1, 2, or 3, may be used. The final disposal of the sputum may be:

1. By pouring it down the water-closet.

2. By cremation when practicable. (a) In a small fire outdoors. (b) In the house heater, using a stout sheet iron box with a handle three feet long. Partly fill the box with sawdust, or fold a paper inside it; pour in the contents of the spit-cup or cuspidor; with the direct draft of the heater open, invert the box over the firepot, holding the box in place a moment until the flame or the heat sterilizes it. When the sputum is to be cremated, but a small quantity of the disinfecting solution should be used in the spittoon.

3. By setting the vessel aside, preferably in a warm place, so that the disinfectant may act eight or twelve hours longer. The quantity of disinfecting solution should be in excess of that of the sputum. Then bury or otherwise dispose of it so that flies and the domestic animals cannot reach it.

The patient should have two spit-cups or spittoons for alternate use. A cover should exclude flies. Cleansing can be done with washing soda and boiling water, or soap and hot water.

D. Knopf's aluminum pocket spit-flask is very convenient, especially when the patient is away from home, is traveling, or is confined to his bed.

E. When away from his room the patient may spit into Japanese paper napkins to be put immediately into a rubber tobacco pouch until they can be burned.

F. Spitting into handkerchiefs should be avoided. If occasionally forced to do this, the handkerchief should be boiled before the sputum dries. Handkerchiefs upon which the sputum is allowed to dry, surround the user with a halo of infection, infect the pocket and everything else they touch, and lessen the patient's chances of recovery. After coughing, the lips should not be wiped with the handkerchief used for the nose. The lips may be wiped with paper napkins to be burned later.

Repress cough as much as possible. Cough gently with the mouth closed as much as possible. Never swallow the sputum. By so doing you favor the extension of the disease to the intestinal tract.

Do not soil personal or bed clothing with the sputum nor the hands when avoidable. Wash the hands often. Male patients, who wear a mustache or beard, should keep it closely clipped.

Do not infect the immediate surroundings of the home, nor spit upon the grass or hay or anywhere else where the sputum may be eaten by cattle, chickens, or other animals.

☞ *Rules for attendants.*

The floors, woodwork, and furniture of rooms in which consumptive patients stay should be wiped with a damp cloth, not dusted nor swept in the dry way.

Clothing may be disinfected by boiling, as in ordinary laundry processes. Rooms may be disinfected with formaldehyde fumigation — large doses — supplemented with the washing of the floor with solution 7. This should be done every few weeks when practicable, while the rooms are occupied by the patient. If the floor or other surfaces are accidently soiled with sputum, the spots should be wet and rubbed thoroughly with solution 7, 1, 2, or 3.

Rooms for consumptives should have no fixed carpets. A few rugs may replace them. They should frequently be carried into the open air and exposed to the action of direct sunshine several hours at a time. For the thorough disinfection of them steam is the best. The tableware of the patient, the knife, fork, cup, and spoons particularly, should be kept separate and washed by themselves in scalding water.

In addition to the danger from infectious dust, if it is allowed to be diffused through the air, there are other possible ways of communicating the infection. It may be carried directly to the mouth by the fingers, or indirectly by handling articles of food. After soiling the hands, cleanse them carefully. Guard against inoculating cuts or abrasions of the hands with the sputum.

☞ *Rules for everybody.*

A. Anything tending to lower the tone of the general health may act as a predisposing cause,— insufficient nutriment, overwork, loss of sleep, worry, close and dusty air. Avoid these. Give sleeping rooms a prolonged airing and sunning by day, and as much night ventilation as is practicable. The dwelling place should be dry naturally or made so artificially. If it is thought that there is a family predisposition to consumption, an outdoor occupation should be chosen. Live in the open air and sunshine as much as possible.

B. Every new case of tuberculosis comes from some earlier case. The germs of this disease retain their vitality and their infectivity a long time under favoring conditions. Therefore do not bring into your house clothing formerly used by consumptives unless it has been thoroughly disinfected; do not move into an infected house or rooms, until the thoroughness of the disinfection is unquestionable; do not put to your lips or mouth, pipes, wind instruments, money or anything else that has been used or handled by consumptives; do not buy bread, milk, or other articles of food, not to be cooked, from consumptives; kissing, particularly lip-to-lip, is unsafe if one party to the act is tuberculous; thorough cooking for meat, or a temperature somewhat below the boiling point (176 F. for 10 minutes) for milk, will render these safe articles of food.

By observing the rules which are expressed and suggested in the foregoing, the principal, if not all danger of infection may be avoided.

The open air treatment of consumptives and those who are threatened with tuberculous disease, has given much better results than any other. Particularly in Germany, and to some extent in this country, such treatment has been systematized in "sanitaria" for consumptives. Here the patients have the advantage of a life under medical regulation, nutritious food, and such exercise or rest as each case requires, but the chief curative agent is an abundance of fresh air. Even in cold winter weather, patients, after a period of gradual habituation, and always guided by the judgment of the physician, pass almost the whole day in the open air, walking or sitting, or lying on resting places comfortably wrapped in blankets and furs. The results obtained in these institutions have been very successful even in those with climatic conditions less favorable than those of many parts of Maine. An abundance of pure air is the all important thing.

DISINFECTING SOLUTIONS.

SOLUTION 1.

Carbolic Acid (pure liquified),	7 ounces.
Water,	1 gallon.

Mix. This is approximately a 5 per cent. solution. For the disinfection of clothing this solution mixed half and half with water will do.

SOLUTION 2.

Lysol,	5 ounces.
Water,	1 gallon.

Mix. This may be used as a substitute for solution 1, one-half the strength sufficing for uncolored clothing. Many colors are changed by it.

SOLUTION 3.

Solutol (crude or pure),	½ pint.
Water,	2 or 3 gallons.

Mix. This is a very efficient disinfectant for excreta, tuberculous sputum, and gross disinfection generally. If to be used in dwelling houses, or wherever the odor of the crude product would be offensive, pure solutol should be used.

SOLUTION 7.

Solution of Formaldehyde (Formalin),	6 ounces.
Water,	1 gallon.

Mix. This mixture contains a little less than 2 per cent. of formaldehyde.

It is a good plan to dissolve 4 or 5 tablespoonfuls of common salt in each quart of solution 1, or solution 2, thereby increasing considerably the disinfecting power of the solution.

NO. 95.

THE PREVENTION OF CONSUMPTION.

Instructions to Consumptives and their Friends.

Consumption is the most destructive disease, the number of persons dying annually from this cause in Michigan amounting to about three thousand.

Consumption is a dangerous communicable disease, the most dangerous one in Michigan. One consumptive may spread the disease to very many healthy persons. The chief danger exists in the expectoration of the consumptive person, and if this expectoration is carefully destroyed before it is dried, little danger need be feared.

Consumptives should be instructed not to spit upon the sidewalks, the floors of rooms, public halls, street and railway cars, and other vehicles, nor where fowls or dairy cows may take in the sputum, or the dust of it with their food. They should spit into pieces of cloth, or receptacles made for the purpose, containing a saturated solution of carbolic acid (one part of carbolic acid crystals to about fifteen parts of water). Such pieces of cloth should be destroyed by fire, before the sputa become dry, and other receptacles should be cleansed with scalding water, their contents having been destroyed or otherwise carefully disposed of. Handkerchiefs which may have been used from necessity should be boiled half an hour before washing.

It is best that all persons who have a cough should carry small pieces of cloth (each just large enough to properly receive one sputum) and paraffined paper envelopes or wrappers in which the cloth, as soon as once used, may be put and securely enclosed, and with its envelope, burned on the first opportunity.

Remember that sputa must never be allowed to become dry.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, August, 1889.

NO. 96.

SIZE 3¼ IN. X 5½ IN.

No..... Street.....

Record No.....

Name.....

Age.....Sex..... Occupation.....

Reported: Date..... by.....

Assigned: Date..... to.....

Order No.....Date.....

(REVERSE.)

Returned: Date..... by.....

C. { Owner / or / Agent } .....Address.....

N. C. C. Reason.....

Recom. { Patient..... / Disinfection.....

Premises: San. Cond.....Previous Instructions.....

Instructions by Inspector.....

Other Cases { Living..... / Dead.....

Remarks.....

.....

NO. 97.

SIZE 5½ IN. X 9 IN.

HEALTH DEPARTMENT.

CITY OF CHICAGO, BUREAU OF CONTAGIOUS DISEASES.

DISINFECTOR'S DAILY REPORT.

C. W. BEHM, M. D.,

Medical Officer in Charge of Disinfection.

SIR:—I hereby report that I have this.....day of

.....1....., disinfected for.....

.....

The premises at.....

Miles from office.....

Number rooms disinfected.....

Area of rooms.....cubic feet.

Formaldehyd used.....C. C.

Disinfection began at.....M.

Rooms opened up at.....M.

Other disinfections performed.....

.....

.....

Signature.....

NO. 98.

CIRCULAR CONCERNING DISINFECTION.

Before leaving the room the patient should have a bath and a shampoo and be dressed in fresh clothes that have not been exposed to the infection. The clothes worn during the sickness must be either burned or disinfected.

Clothing that can be boiled is most easily disinfected by boiling it for half an hour. Clothing that cannot be boiled will be disinfected by the Health Department men.

Sheets and pillow cases are disinfected by boiling. Blankets, feather beds, pillows, mattresses, and comforters will be disinfected by the Department.

Furniture, floors, and woodwork should be washed in a disinfecting solution of corrosive sublimate. The corrosive sublimate will be furnished by this Department. It should be used carefully, according to directions, as it is very poisonous. A corrosive sublimate solution cannot be used with soap, therefore it is better to do any necessary scrubbing first and then wash over with the disinfecting solution. The wall paper may be removed and burned, or the walls may be wiped off with a cloth placed on a broom and the cloth may then be burned. The ceiling is not very likely to be infected. It may be whitened. Small articles should be wiped with a cloth wrung out in a disinfecting solution.

Upholstered furniture should not be kept in the room. If such by chance should be infected, it should be thoroughly sprayed or dampened with a disinfectant. Formalin is the best for this.

Lastly the room should be thoroughly aired.

The following are good disinfecting solutions:

I. Carbolic acid; a half cupful of the strong acid to a pail of water.

II. Corrosive sublimate; three drachms to a pail of water.
The box furnished by the Health Department contains enough for one pail of water.

III. Formalin, one ounce to three pints of water.
The bottle furnished by the Health Department contains enough for three pints of water.

Corrosive sublimate and formalin will be furnished by the Health Department when requested.

Usually the Department men can do their part of the disinfecting the next day after they receive orders from the Superintendent. Sometimes a longer delay is necessary. The Department does its part of the work free of charge.

PROVIDENCE, November, 1899.

NO. 99.

SIZE 6 IN. x 6¼ IN.

Return Swab and both Tubes.

DIPHTHERIA.

Name of Patient ..... Age .....
Address .....
Attending Physician ..... Address .....
Name of Maker of Culture .....
Date ..... Time ..... No. of Culture .....
Duration of Disease .....
How Contracted? .....
How Many in Family? Adults ..... Children .....
Can Case be Isolated? .....
Does Patient attend School? ..... Where? .....
Location of Membrane .....
Was Culture Inoculation Satisfactory? .....
Clinical Diagnosis .....
If made before Examination .....

NOTICE.—An Examination of this Culture will not be made unless the Physician *completely* fills out blank.

Return Swab and both Tubes.

[illegible]

[illegible]

[illegible]		Laboratory No.	
[illegible]		Line / Female	White / Colored
[illegible]	[illegible]	[illegible]	Clinical Diagnosis.
[illegible]	[illegible]	[illegible]	Number of children immunized
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	

[illegible] Department:

[illegible] 5th...

[illegible] 10th...

[illegible] on other side.

[illegible]

[illegible]

[illegible]

[illegible] 189....

..... City.

[illegible]

[illegible]

M. D.,

[illegible] Municipal Laboratory.

[illegible] throats of healthy [illegible]

[illegible] first culture when it [illegible]

[illegible] does.

[illegible] inoculation of the culture [illegible]

[illegible] distinguished, the case will be [illegible] are examined.

NO. 102.

SIZE 5½ IN. X 8 IN.

Laboratory No.....

HEALTH DEPARTMENT.

DIVISION OF PATHOLOGY, BACTERIOLOGY AND DISINFECTION.

NEW YORK,.....189....

Dr.....

Dear Sir:

The examination of the.....culture made by inoculating the tube with the exudation from the throat of.....

.....

on.....does not admit of an exact bacteriological diagnosis, for the following reasons:

A. The inoculation was made at so late a period in the disease that it is possible the diphtheria bacilli, though now absent, were at an earlier time present.

B. The growth on the culture medium was so scanty that it is possible the inoculation was not properly made, or that some antiseptic had been applied to the throat shortly before the tube was inoculated.

C. The culture was in some way contaminated by saprophytic bacteria, covering the medium, and obliterating the growth of throat bacteria.

D. The culture medium was dry.

E. The bacilli present, though resembling diphtheria bacilli, were not sufficiently characteristic for positive identification.

F. No diphtheria bacilli were found; but the location of the lesion (laryngeal) precludes the certainty that they may not be present.

1. A prompt confirmatory culture is requested.
2. The case will be treated as one of diphtheria.
3. The case will be treated as one of false diphtheria, unless the physician in charge of the case requests otherwise.

Examined by.....

HERMANN M. BIGGS, M. D.,

Pathologist and Director of the Bacteriological Laboratory.

NO. 103.

SIZE 5½ IN. X 8 IN.

HEALTH DEPARTMENT.

DIVISION OF PATHOLOGY, BACTERIOLOGY AND DISINFECTION.

SPUTUM FROM A CASE OF SUSPECTED TUBERCULOSIS.

Name of patient.....

Age.....Sex.....

Address.....

Occupation.....

Attending Physician.....

Address.....

Clinical Diagnosis.....

Duration of Disease.....

Have there been cases of consumption in the family?.....

How many?.....

Relation to patient.....

.....

Date of last case.....

NO. 104.

SIZE 5 IN. X 5 IN.

BACTERIOLOGICAL LABORATORY, BUFFALO, N. Y.

Directions for Collection of Sputum for Bacteriological Examination in Pulmonary Tuberculosis.

Sputum should be collected only in clean, wide-mouthed, well-stoppered bottles, with a capacity of at least four ounces.

Care should be taken that bronchial and not pharyngeal secretion is collected, and the expectoration discharged early in the morning is to be preferred. If the expectoration is scanty, the entire amount discharged in twenty-four hours should be collected.

NO. 105.

SIZE 5½ IN. X 8 IN.

Laboratory No.

HEALTH DEPARTMENT, BALTIMORE.

TYPHOID FEVER.

Physician ..... Date .....
..... No. of Specimen.
Address ..... Agglutination (to be filled out at department) .....
.....
Patient .....
Address .....
..... Motility .....
Age .....
Day of Disease ..... Diagnosis .....
.....
History of previous attacks .....
.....
Clinical Diagnosis .....
.....
Quinine or Blood test for exclusion of malaria (if made) .....
.....
Other symptoms (in brief) .....
.....

NO. 106.

SIZE 3 IN. X 5½ IN.

ILLINOIS STATE BOARD OF HEALTH.

PERSONAL CERTIFICATE OF VACCINATION.

(1) ..... Ill.
I hereby Certify that I have, this (2) ..... day of ..... 189....
examined (3) ..... and pronounce
(4) him / her in my judgment, properly protected against SMALL-POX or VARIOLOID by reason of (5)

(A) Successful *recent* primary vaccination.
(B) Successful *recent* re-vaccination.
(C) ..unsuccessful *recent* attempts at vaccination.
(D) Previous attack of small-pox or varioloid.

(6) ..... M. D.

Explanation of figures: 1—Write in the name of city, town or village. 2—Insert date. 3—Give name in full. 4—Strike out superfluous pronoun. 5—Check the initial "A," "B," "C" or "D" which indicates the "reason." If it be "C," add number of attempts. 6—Signature of certifying physician, *who should in all cases be a legally-qualified practitioner.*

NO. 107.

SIZE 5½ IN. x 8 IN.

ILLUSTRATIONS OF MODES OF USING THE VACCINATION RECORDS.

NOTE.—It will be understood that the figures and words or phrases printed in *italic*, in these illustrations, are hypothetical—the reporting physician will, of course, insert his own figures; give his own reasons for preferring bovine to humanized virus (or *vice versa;*) and furnish the proper address of the propagator whose bovine virus he has found most trustworthy.

Where the physician has met with *noteworthy vaccinal complications, sequelæ* or *results*, it is especially desired that these be reported separately, with as much fullness of detail as may be deemed necessary. Facts concerning reported fatal results, amputated arms, communicated disease, *et cæt.*, should, in all cases, be furnished. "Facts" only can set the public mind at rest on these points.

Of more purely professional interest would be data concerning *unusual latency of virus* (as manifested by prolonged delay in manifestation of activity;) *final success after repeated failures; successful vaccination after an attack of variola; frequent successful vaccinations of the same individual; success of bovine, after failure of humanized virus* (or the reverse;) *modes of performing the operation.*

Proper credit will be given, in the published report, for all information. To this end records and statements should be dated, post-office address given, and name of reporting physician signed in full.

DATE.....1882.

SIR: During the past *fifteen* months, I have performed vaccinations as follows:

	VIRUS.	SUCCESSFUL.	FAILURES.
Primary.....	Bovine....	300	50
"	Humanized	100	15
Revaccinations	Bovine....	300	100
"	Humanized	100	25

[*Strike out needless words and initials.*]

Examined usually on *8th* and *9th* days.

Prefer ■ II Virus, because of *greater uniformity of results, freedom from complications, less severity of efforts.*

With B V have obtained best results with that propagated by *Richard Roe & Co.*, of *Beaugency, France.*

Have had ■■ noteworthy complications and results.

■■

Above data given from records.

Don't forget to sign.....M. D.

P. O. Address:.....*and fill this space and date at top*.....Ill.

DATE.....1882.

SIR: During the past *fifteen* months, I have performed vaccinations, as follows:

	VIRUS.	SUCCESSFUL.	FAILURES.
Primary.....	Bovine....	300	50
"	Humanized	100	15
Revaccinations	Bovine....	300	100
"	Humanized	100	25

[*Strike out needless words and initials.*]

Examined usually on *8th* or *21st* day.

Prefer B ■ Virus, because of *freedom from danger of transmitting other disease, greater potency and protective power.*

With B V have obtained best results with that propagated by *Richard Roe & Co.*, of *Beaugency, France.*

Have had ■■ noteworthy complications

■■ results.

or

Above data given from ■■■ memory.

Don't forget to sign.....M. D.

P. O. Address:.....*and fill this space and date at top*.....Ill.

NO. 108.

SIZE 3½ IN. X 8 IN.

BOARD OF HEALTH BLANK.

PHYSICIAN'S CERTIFICATE.

PHILADELPHIA.....189

I hereby certify, from personal examination, that.....
Age.....Residence.....
is successfully vaccinated, or has had Smallpox.

.....M. D.

.....Residence.

NO. 109.

SIZE 5 IN. X 8 IN.

The Principal will please destroy this Permit upon admitting pupil.

HEALTH DEPARTMENT.

SANITARY BUREAU.

DIVISION OF CONTAGIOUS DISEASES.

Criminal Court Building,

CENTRE, WHITE, ELM, AND FRANKLIN STREETS.

NEW YORK.....189

The bearer.....has been vaccinated (.....)
and may attend school.

This is not a certificate of successful vaccination, but is only a permit to attend until examined by an officer of this Department.

CHAS. S. BENEDICT, M. D.,
Chief Inspector.

NO. 110.

SIZE 6 IN. X 11 IN.

Stub to be retained at Station.

FOR GRATIS USE.

Furnished...vial...No...

To Dr.....

Date.....1895.

Hour....., ...M.

Culture tube received.

Date.....1895.

Hour....., ...M.

To be forwarded to the Health Department with Culture Outfit. Diagnosis and Report not Required for Antitoxin No. 1, which is used only for Prophylaxis.

Received from the Chicago Health Department, through Diphtheria Antitoxin Station No...., ...10 c. c. vial....Diphtheria Antitoxin No....for gratis use in the case of 1).....

2).....

payment for which remedy *I hereby Certify*, upon information and belief, would be a hardship to the patient or family.

It is understood that the conditions — hereby accepted by me — upon which the Department furnishes this Antitoxin without charge are —

First, that the *diagnosis* of the case shall be submitted to bacteriologic investigation, for which purpose I undertake to return to this Station within twelve hours after receipt of the serum a culture tube properly charged with exudate from the throat of the patient.

Second, that I will make a *clinical report* of the case promptly upon its termination, to the Bureau of Contagious Diseases on the blank form furnished by the Department for that purpose.

3).....M D.

4).....

Date: 5).....1895.

Hour: 6)....., ...m.

Culture tube returned.....1895, hour....., ...M.

NOTE.— Spaces numbered 1 (name of patient), 2 (address of patient), 3 and 4 (signature and address of physician), 5 and 6 will be filled in by the physician who receives the Antitoxin. All other spaces will be filled in by the druggist, who will send this Receipt to the Department, with the Culture Outfit.

NO. 111.

[illegible]

[illegible]

[illegible] 189

[illegible] Add.....

[illegible] Add.....

[illegible] Units injected.....

[illegible] .....

[illegible] Membrane. .....

.....

[illegible] .....

[illegible] Tracheotomized?.....

[illegible] Day of Decease .....

[illegible] System, &c.....

.....

[illegible] .....

.....

.....

[illegible] after 6 weeks).....

[illegible] .....

[illegible] information can be furnished.

NO. 112.

[illegible]

[illegible] DIPHTHERIA 189 . ANTITOXIN.

No. Name	Yrs. Sex Color
N St. Ave. Ave Ward	Clin. Diagnosis
Dr. No.	Mild Severe Site Exudate
St. Ave.	
Date culture 11 days Loc. Membrane	Injected M. C. C.
Clin. Diagnosis	
Date Exam. Bact. Diagnosis	Croup began before after first injection
	Recovery Urticaria Joint pains
Convalescent Exx.	
	Death hours after first injection
	M. the day of 189 .
Contagious days	from
Reported Antitoxin	Tracheotomy Dr.
As Returned	Intubation 189 .

NO. 113.

SIZE 8 IN. x 11 IN.

Date .....

Issued to.....
who has been in Atlanta, Ga., from.....
.....
for.....days, and has not been in an infected or suspected locality of Smallpox or Yellow Fever for.....days.

Certificate issued by

.....

ATLANTA, GA.....

TO WHOM IT MAY CONCERN:

THIS IS TO CERTIFY, That Mr.....
.....
on oath says that he has been in ATLANTA, GA. from.....
for..... days, and that he has not been exposed to the infection of Yellow Fever, or Smallpox, and has not been in any infected or suspected locality for.....days.

.....

Description: Age.....years. Weight..... pounds. Height .....Complexion.....
Hair..... Eyes.....

.....

Secretary Board of Health.

Sworn and subscribed this.....day of
.....

.....

Notary Public, Fulton County, Ga.

NO. 114.

SIZE 7 IN. x 7½ IN.

STATE QUARANTINE.

1. At what Station did you, or any irresponsible person traveling in your charge, get on this Train?
   Answer.....Destination? .....
2. Where have you, or has any irresponsible person, traveling in your charge, been for the past ten days?
   Answer.....
3. So far as you know, have you, or has any irresponsible person traveling in your charge, been exposed to yellow fever within the past ten days?
   Answer.....
4. Have you, or has any irresponsible person traveling in your charge, been within the past ten days, in.....
   .....
   .....
   or any other place infected with yellow fever, and, if so, in what place?
   Answer.....
5. When were you, or was any irresponsible person traveling in your charge, last in either of the above named places, and if there, for how long?
   Answer.....

I,.....do solemnly swear that the answers to the foregoing questions are true, SO HELP ME GOD!

Sworn to and subscribed before me this.....day of.....1899.

QUARANTINE OFFICER.

NOTE.—Untrue answers to any of the above questions will expose the affiant to severe penalties.

[illegible]

[illegible]

[illegible]

NO. 116.

SIZE 8½ IN. x 11 IN.

PHILADELPHIA,.....189

To the Board of Health:

The undersigned respectfully app.....for a License to clean privy wells and sinks, and to remove the contents thereof, under the provisions of the Laws of the State, and in conformity to the rules and regulations of the Board.

.....*bona fide* the owner of,.....horses.....pumps.....tanks, ...trucks.....barrels.....feet of rubber hose.....hoods..... feet air hose.....furnaces, etc., which number.....intend to employ in the business. Said apparatus are all in good working order, and the accommodations for keeping them are under cover and out of public view. .....also state that .....not in collusion or combination with any person or persons to deceive or defraud the Board, and further that the representations herein contained are all true.

.....propose..... .....

Residence.....

And.....

Residence.....

.....as sureties upon.....bond.

Very respectfully, your obedient servant,

.....

Residence,.....

Place of business,.....

I CERTIFY, That the above applicant is the owner of the number of horses, vehicles, and apparatus named in the application, and that they are all in good working order, and that the law has in every respect been fully complied with.

.....

Health Officer.

Philadelphia,.....189

(REVERSE.)

PHILADELPHIA.....189

.....being duly sworn or affirmed according to law, doth depose and say, that the allegations made in Petition for License to Clean Privy Wells, are true, and that no one is interested or concerned in the said License, except those named in the said Petition, and that will do no work for Parties not owners or Agents of Properties, except by order of Board of Health.

Sworn or affirmed, and subscribed before me this)
.....*day of*.....) .....
A. D. 189)

.....*Health Officer.*

NO. 117.

a. The apparatus for the removal of the contents of privy wells, vaults, sinks, etc., shall consist of pumps, tanks, hose, deodorizing furnaces, or other efficient deodorizing apparatus, tents or hoods, dunnigans or barrels, and trucks as hereinafter described.

b. The pumps shall be suitable for the purpose required, and shall have valves not less than four inches internal diameter, which will allow obstructive rubbish and some solid excrementitious matter to pass freely through the pump, and be forced through the hose to the tank.

[illegible] water.
[illegible] well
[illegible] prevent
[illegible]

[illegible] cubic feet [illegible]
[illegible] the Board of
[illegible] the rear end.
[illegible]

[illegible] thoroughly de-
[illegible] screen or
[illegible] prevent

[illegible] give space
[illegible] the walls of the
[illegible] the floor, and so
[illegible]

[illegible] by a spiral
[illegible] less than five
[illegible] the air hose shall
[illegible] feet from the
[illegible] point with the
[illegible] below the grate
[illegible]

[illegible] connection shall
[illegible] full of burning
[illegible] the tent.
[illegible] their capacity
[illegible] the Board of
[illegible] ams, and made
[illegible]

[illegible]

[illegible] 18
[illegible] ereby authorized to
[illegible]
[illegible] said work to be com-
[illegible]

[illegible] Health Officer.

[illegible] N. Y. 18
[illegible] .....day of
[illegible] bottom, the .....
[illegible] containing .....cubic feet;
[illegible] contents of the said .....
[illegible] designated by the Health Officer.

.....*Scavenger.*

[illegible] OF YONKERS, N. Y. 18
[illegible] ave [illegible] day examined the [illegible] No. .....
and found the same thoroughly emptied and disinfected.

.....*Sanitary Inspector.*

No..... Date.....189

PERMIT TO CLEAN PRIVY WELL.

Issued to.....

House No.....

.....

.....

Employed by.....

to be cleaned within two days from date. Sundays excepted.

$.....

PERMIT TO CLEAN PRIVY WELL.

No..... Philadelphia.....189

Permission is hereby granted to .....to clean the privy well of premises No.....

.....

and to carry away the contents thereof, conformably to law and the Rules and Regulations of the Board of Health, within two days from date, Sundays excepted, between the hours as per Rules in force at this time.

.....

is the owner or agent of said premises, and is represented as having employed the said Licensed Cleaner to clean the above named privy well.

By order of the Board of Health,

$..... .....Clerk.

HEALTH OFFICE.

No....Philadelphia,.....189

Received of.....

the sum of.....

for permit to clean the Privy Well of

Premises No..... .Street,

.....

Health Officer.

$..... .....

NO. 119.

SIZE 4 IN. X 16 IN.

NO. 120.

The following form is issued in Baltimore. The stub is filed under the scavenger's name and the permit is endorsed at the night-soil dock where a fee has to be paid for each load put on the scow, and is then returned, and filed with the stub.

SIZE 4 IN. X 9 IN.

DUPLICATE.

Application for permission to open and clean privy on premises No.....

.....St.

Owner or Agent Mr.....

.....loads. Work to be done by

.....

Address.....

Not Good Unless Signed by Commissioner of Health.

Application for permission to open and clean privy on premises No.....St.

Owner or Agent Mr.....

.....loads. Work to be done by

.....

Address.....

Permission is given to do this work in compliance with the regulations of the Health Department; and this permit, endorsed by the Superintendent of the Dump, shall be returned to this office within 48 hours from this date.

.....

NO. 121.

SIZE 5½ IN. X 8 IN.

NIGHT SCAVENGER PERMIT.

No.....

Mr.....whose registered license is No.....

is hereby ordered to remove contents of and clean.....Privy Vault at No

.....Street.....Ward, which is owned by

.....and remove the same to beyond city limits within five days from date, and make report to this office, according to Sec. 212 of the General Ordinances of the City of Milwaukee, passed Nov. 10, 1890, and amendment passed Nov. 14, 1892.

MILWAUKEE,.....189

.....

Commissioner of Health.

No.....OF RETURN.

I hereby certify that I have cleaned.....Privy Vault at.....

.....Street,.....Ward, by order of.....

and removed.....yards from said premises to.....

on the.....day of.....189.....

according to permit issued by the Health Commissioner, on.....

189....., and charged for said work the sum of $.....

.....

Scavenger License No.....

MILWAUKEE,.....189

NO. 122.

SIZE 8½ IN. x 11 IN.

REPORT OF MEDICAL INSPECTOR OF SCHOOLS AND AGENT OF THE BOARD OF HEALTH, OF BOSTON.

For the Month of.....189 .

LIST OF DISEASES FOUND IN SCHOOLS.	SCHOOLS.										TOTALS.
TOTALS.											

Number of pupils examined in the schools.....
Number recommended to be sent home.....
Number consultations with teachers (about pupils returning to school, etc.).....

.....
Medical Inspector of Schools, and Agent Board of Health.

NO. 123.

RULES FOR

CARE OF INFANTS.

DEPARTMENT OF HEALTH, CITY OF NEW YORK,
Criminal Court Building,
Centre, White, Elm and Franklin Streets.

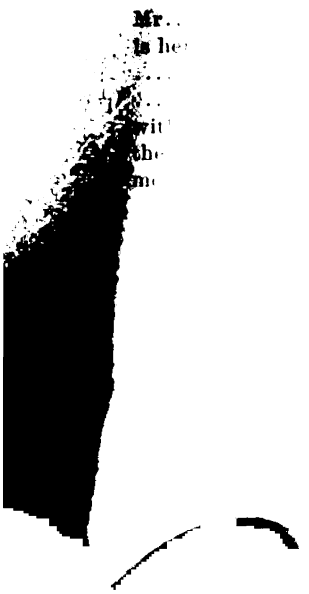
June, 1898.

The following series of rules (approved by many physicians) for the management of children during the hot season, with a view to prevent the large annual mortality of this class, submitted by the Sanitary Committee, is approved and published by the Board:

The following form
ger's name and the per
paid for each load put

DUPLI

Application for
and clean privy
.....
Owner or Agen
.....loads. W
.....
Address...



NO. 124.

HEALTH DEPARTMENT.

SUGGESTIONS FOR THE CARE OF INFANTS.

The proper food for an infant is its mother's milk.

If the mother's milk fails use cow's milk.

Milk must be fresh, sweet and pure. Adulterated milk makes sickly children.

Except in cold weather, *put the milk as soon as received in a preserve jar and scald it;* screw on the cover tight, and keep it on ice if possible.

For an infant under four months, the milk should be diluted with one-third to one-half water. After that time it may gradually be made stronger. It is a good plan to add sugar of milk (never ordinary sugar) and sweet cream to the milk. A teaspoonful of sugar of milk, and four tablespoonfuls of cream to a pint of milk is a good proportion. The milk should be diluted, and the cream should be added before the milk is sterilized, and the sugar of milk afterwards.

Never give condensed milk, or any other food, or any molasses candy, sugar, or anything else whatever, without the advice of a physician.

Nursing bottles should have a rubber nipple attached directly to the neck of the bottle. *Never use a nursing bottle with a long tube.* The "Graduated Nursing Bottle," with the tablespoonfuls marked in glass, is the best and cheapest. When not in use the bottles should be filled with saleratus water, and the nipples should also be kept in such water. Scald immediately after using, and *keep bottles and nipples perfectly clean.* Rinse again before using.

Infants are frequently fed too much and too often. They are more apt to cry from stomach-ache after over-feeding than they are to fret because they are hungry. The time of feeding and amount of food vary with the age.

The quantities given below are not for the undiluted milk, but for the milk properly diluted. Dilute the milk first, then measure out the proper amounts. If the milk is to be sterilized, dilute and measure before sterilizing. *Never feed oftener than once in two hours.*

For the first week	. .	not over	3	tablespoonfuls every	2 hours.
From the first week to the sixth	" "	4	"	"	2 "
" six weeks to four months,	" "	8	"	"	3 "
" four months to ten months,	" "	12	"	"	3 "
At ten months - - -	" "	16	"	"	3 "

At three months an infant can readily go six hours (at night) without food, and at six months it can go from 10 o'clock P. M. until 6 A. M.

Nursing infants take the breast at the same hours that bottle babies are fed.

Feed the baby at regular hours, even if it has to be waked. This is very important, both for the mother and the baby.

The baby should also sleep, have its bath and go out at as near the same time as possible every day.

Do not have the food too hot or too cold; always about blood warm.

Do not wean a baby or change its food during the summer months, (between June 1st and October 1st), without the advice of a physician.

Never neglect vomiting or looseness of the bowels. Consult a doctor at once; by so doing you will save him many visits.

Give no paregoric, laudanum, soothing syrup or other medicine without a doctor's advice.

When an infant purges or vomits give it nothing to eat for four or six hours.

An infant should have from one to three movements every twenty-four hours. They should be soft and yellow. If they are not right consult the doctor. Don't attempt to dose the child yourself.

[redacted]

NO. 126.

SIZE 8¼ IN. X 14 IN.

DEPARTMENT OF HEALTH OF THE CITY OF NEW YORK.

Borough of.....

(MERCANTILE ESTABLISHMENTS.)

NEW YORK.....

To the Board of Health, City of New York:

GENTLEMEN:—Application is hereby made for a Certificate of Employment by the undersigned, ...he being physically able to perform the duties of JUNIOR HELPER.

(Signature of Applicant).....

(Address).....

.....

AFFIDAVIT OF PARENT, GUARDIAN OR PERSONS STANDING IN PARENTAL RELATION TO THE APPLICANT.

Extract from Section 163, Chapter 415, Laws of 1897.

CERTIFICATE FOR EMPLOYMENT, HOW ISSUED.—Such certificate shall be issued by the executive officer of the board, department or commissioner of health, of the city, town or village where such child resides or is to be employed, or by such other officer thereof as may be designated by resolution for that purpose, upon the application of the child desiring such employment. At the time of making such application there shall be filed with such board, department, commissioner or officer the affidavit of the parent or guardian of such child or the person standing in parental relation thereto, showing the date and place of birth of such child. Such certificate shall not be issued unless the officer issuing the same is satisfied that such child is fourteen years of age or upward, and is physically able to perform the work which he intends to do.

No fee shall be demanded or received for administering an oath as required by this section.

STATE OF NEW YORK,)
CITY OF NEW YORK,) ss.: .....

residing at.....in the.....State of.....
being duly sworn, say that....he is (father, mother, guardian, or stands in parental relation to the above-named applicant); that said applicant was born at.....
in.....on the.....day of.....in the year 18....

(Signature).....

Sworn to before me this.....day)
of.....189..)

.....*Notary Public.*

[illegible]

[illegible] .....school

[illegible] ne school year, during [illegible] ars, or during the year [illegible] English grammar and [illegible]

[illegible]

[illegible] STRUCTION.

[illegible] State of [illegible] instruction in reading, writing, [illegible] equivalent instruction, by [illegible] period equal in length to one [illegible] at the age of fourteen years, or [illegible]

[illegible]

[illegible] Designation) [illegible]

[illegible] INSPECTOR.

[illegible] have examined [illegible] satisfied that he is fourteen years of age or [illegible] perform the duties of JUNIOR HELPER.

M. D.,

Inspector.

[illegible]

INFORMATION AS TO APPLICANT.

[illegible]		Date of Birth	
[illegible]		Place of Birth	
[illegible]		Color of Eyes	
[illegible]	feet. inches.	Weight	[illegible]

FACIAL MARKS.

REMARKS.

[illegible] 189

[illegible]

NO. 127.

SIZE 8½ IN. x 11 IN.

TENEMENT OR LODGING HOUSE CERTIFICATE,

DEPARTMENT OF HEALTH.

Office of Health Commissioner.

ERNEST WENDE, M. D.
Health Commissioner.

BUFFALO, N. Y.....189 .

THIS IS TO CERTIFY, That I....., residing at No.....
.....Street, in the city of....., State
of....., am the owner of the.....house at No.....
.....Street, in the city of Buffalo, N. Y., That.....
.....of No..... .....Street, is
the resident agent for the management of said.....house. That said.....
house is situated at No..... .....Street, in said city of Buffalo,
and contains.....sets of apartments, with.....rooms to each set of apartments.
The number of persons occupying each apartment is as follows:.....
.....
.....

That the following trades and occupations are carried on in said.....house:
.....

That I filed on the.....day of.....18...in the office of the
Department of Health, in said city, a plan or diagram of the lot on which said
.....house is situated, and of each floor of said.....house,
in accordance with the provisions of Sec. 123 of Ordinances of the city of Buffalo,
regulating tenement and lodging houses, and that no changes have been made affecting
said plan or diagram previously filed with said Department of Health, except
.....
.....
.....
.....
.....
.....
.....

.....*Owner.*

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